CONTRACT DOCUMENTS &

TECHNICAL SPECIFICATIONS

PWC2324040

P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT

ISSUED FOR BID

DECEMBER 20, 2023

Fayetteville Public Works Commission
Administrative Building
955 Old Wilmington Road
Fayetteville, NC 28301

TABLE OF CONTENTS

SECTION A – PROJECT SPECIFICS GENERAL

*** THIS PAGE WAS INTENTIONALLY LEFT BLANK ***

ADVERTISEMENT FOR BID
FAYETTEVILLE PUBLIC WORKS COMMISSION
P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT

Cumberland County
North Carolina

Pursuant to N.C.G.S 143-129, sealed bids are solicited and will be received at Fayetteville Public Works Commission, Administration Building, Conference Room 107, 955 Old Wilmington Road, Fayetteville, NC 28301, until **1:00 p.m., EST Thursday, January 18, 2024**, at which time they will be publicly opened and read for the following:

Furnishing and delivery of all materials and equipment (except materials and equipment specified to be furnished by the Commission) complete and conforming to the Specifications for the installation of the P.O. Hoffer 69 X 25 X 15 kV Substation.

The foregoing description shall not be construed as a complete description of all work required. All work shall be done in accordance with PWC technical specifications and standard contract terms.

A **MANDATORY** pre-bid meeting will be held at **1:00 p.m., EST Thursday, January 4, 2024**, in the Skills Lab, Fayetteville Public Works Commission, Administrative Building, 955 Old Wilmington Road, Fayetteville, NC 28301. Representatives of the Owner and Project Engineer will be available to answer questions. Any formal bid submitted by a Bidder that fails to attend this meeting will be considered an unresponsive bid.

Questions will be fielded at the pre-bid meeting and all prospective bidders are required to attend the meeting. Individual telephone inquiries are prohibited. PWC assumes no responsibility to fully inform absentees of clarifications not issued by addendum.

Bids must be enclosed in a sealed envelope addressed to Victoria McAllister, Procurement Manager, Fayetteville Public Works Commission, 955 Old Wilmington Road, Fayetteville, North Carolina 28301. The outside of the envelope must be marked **SEALED BID: P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT** and shall indicate the name, address and state license number of the bidder. Bids shall be submitted on the printed forms, or exact copies thereof, contained in the Contract Documents.

Each bid shall be accompanied by a bid bond of five percent (5%) of the bid executed by a surety company licensed under the laws of North Carolina to execute the Contract in accordance with the bid bond and upon failure to forthwith make payment, the surety shall pay the obligee an amount equal to the amount of said bond. Said deposit shall be retained by the Owner as liquidated damages in event of failure of the successful bidder to execute the Contract within ten (10) days after the Notice of Award or give satisfactory surety as required by law.

Performance and Payment Bonds are required in the amount of 100% of the Contract amount and shall be furnished by the Contractor.

All Contractors are notified that North Carolina Statutory provisions as to licensing of Contractors will be followed as applicable in receiving and evaluating bids and in reading and awarding the Contract (Chapter 87 of the North Carolina General Statutes).

The license classification shall be:

Part 1: Public Utilities - Unlimited

Plans and Specifications including Contract Documents will be available online for viewing and downloading on or about **December 20, 2023** on the PWC Procurement website at https://www.faypwc.com/purchasing. In addition, the documents will be available from the Fayetteville State University Construction Resource Office (FSU CRO) at https://www.uncfsu.edu/academics/colleges-schools-and-departments/broadwell-college-of-business-and-economics/outreach-centers/construction-resource-office. In collaboration with the North Carolina Institute of Minority Economic Development, the FSU CRO offers services and support to help small, minority, veteran, and women-owned businesses identify and compete for construction-related projects.

At the FSU CRO, potential bidders may:

- Research, view and print project drawings to scale free of charge;
- Use available software to prepare their bid; and
- Receive certification and pre-qualification assistance.

Please email the FSU CRO to make an appointment: fsucro@uncfsu.edu

Plans and Specifications are also being furnished to ISQFT (www.isqft.com) for online posting. Purchase of the documents is not required to bid.

Fayetteville Public Works Commission reserves the right to reject any or all bids for any reason determined by PWC to be in its best interest, or to award the bid to the lowest responsible bidder or bidders, taking into consideration quality, performance, and the time specified in the bids for the performance of the contract.

The bidder to whom the contract may be awarded must comply fully with the requirements of North Carolina General Statutes Section 143-129, as amended.

No bids may be withdrawn after the scheduled Bid Opening for a period of ninety (90) calendar days.

FAYETTEVILLE PUBLIC WORKS COMMISSION
Victoria McAllister
Purchasing Manager

00100 - INSTRUCTIONS TO BIDDERS
FAYETTEVILLE PUBLIC WORKS COMMISSION
P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT

A. DEFINED TERMS

Terms used in these Instructions to Bidders are defined in the Definitions and Terminology sections of PWC General Conditions.

B. COPIES OF BIDDING DOCUMENTS

1. Complete sets of the Bidding Documents as stated in the Invitation to Bidders, may be obtained from the PWC Procurement Department.

2. Complete sets of Bidding Documents shall be used in preparing Bids. PWC assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

C. EXAMINATION OF CONTRACT DOCUMENTS, OTHER RELATED DATA, AND PROJECT SITE

1. Before submitting a Bid, each Bidder shall (a) examine the Contract Documents thoroughly, (b) visit the site and become familiar with the site and any local conditions that may in any manner affect the cost, progress, or performance of the Work, (c) be familiar with federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the Work, and (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) give the PWC Procurement Advisor written notice of all conflicts, errors or discrepancies in the Contract Documents.

2. Bidders should consult the Specifications for the identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or reports that otherwise may affect cost, progress, or performance of the Work which may have been utilized in the preparation of the Drawings and Specifications. PWC will make copies of such reports if available at the cost (non-refundable) of reproduction to any Bidder requesting them. These reports are not intended to constitute any explicit or implicit representation as to the nature of the subsurface and latent physical conditions, which may be encountered at the site or to constitute explicit or implicit representations as to any other matter, contained in any report. Such reports are not guaranteed as to accuracy or completeness and are not part of the Contract Documents. Before submitting a Bid, each Bidder will, at its own expense, make such investigations and tests as the Bidder may deem necessary to determine his Bid for the performance of the Work in accordance with the Contract Documents.

3. On request (minimum 48 hours advance notice), PWC will provide each Bidder access to the site to conduct such investigations and tests, as each Bidder deems necessary for submission of its Bid.

4. The lands upon which the Work is to be performed, right-of-way for access thereto, and other lands available for use by the Contractor in performing the Work are identified in the Contract Documents.

5. The submission of a Bid constitutes an incontrovertible representation by the Bidder that it has complied with every requirement of this Section and that the Contract Documents are sufficient in scope and detail to indicate and convey an understanding of all terms and conditions for the performanceof the Work.

D. INTERPRETATIONS AND ADDENDA

1. All questions about the meaning or intent of the bid or Contract Documents shall be submitted in writing to Victoria McAllister, Procurement Manager, by email to procurement@faypwc.com. In order to receive consideration, questions must be received by 5:00 p.m. E.T., on Monday, January 8, 2024. Any interpretations of questions so raised, which in the opinion of the Project Engineer require interpretations, will be issued by Addenda via email or posted online by the Owner and/or Project Engineer. An Addendum extending the Bid Opening date may be issued up to five (5) business days before the Bid Opening date. An Addendum withdrawing the Invitation for Bid may be issued any time prior to the Bid Opening date. The Owner and Project Engineer will not be responsible for oral interpretations or clarifications, which anyone presumes to make on their behalf.

Bidders are expressly prohibited from contacting any PWC official or employee associated with this project, except as noted above. Violation of this prohibition is grounds for the immediate disqualification of the bidder.

2. PWC may issue such additional Addenda as may be necessary to clarify, correct, or change the Contract Documents. Such Addenda, if any, will be issued in the manner and within the time stated in Paragraph 1 of this Section.

3. Each Bidder shall be responsible for determining that all Addenda issued by PWC have been received before submitting a Bid for the Work.

4. Each Bidder shall acknowledge the receipt of each Addendum on the Bid Form.

E. QUALIFICATION OF CONTRACTORS

1. **Bidder's Qualifications** – The Bid package shall include the completed Proposed Project management Staff form and all supporting documentation. The contractor shall include, the proposed project management staff, i.e., project manager, site superintendent, general foreman, etc. The qualifications / work experience level of the Bidder's proposed work force shall be included as well. The Contractor shall provide evidence of a minimum of 60% of the proposed work force having five (5) years or more tenure with the Bidder's firm. If other personnel are actually assigned to the project, similar information will be required prior to construction assignment. If the proposed staff along with their qualifications is not provided, the bid may be subject to non-compliance, thus, making it unacceptable.

2. **Statutory Requirements** – The Bidder shall comply with all federal, state, and local statutes, regulations, and codes as they relate to the Project. Failure to comply with these requirements shall be considered a breach of Contract.

3. **References** - The Contractor shall provide a list of recent projects of similar voltage class and complexity, along with the Owner and contact information of the representative who was reported to directly.

4. **Proposed Construction Schedule**- The Contractor shall submit a proposed project construction schedule with the Proposal using *Microsoft® Project*, for review and approval by the Owner and Engineer.

F. SUBSTITUTE MATERIAL AND EQUIPMENT

The Contract, if awarded, will be on the basis of material and equipment described in the Drawings orrequired in the Specifications without consideration of possible substitute or "or-equal" items. The procedure for submittal of substitute or “or-equal” items for consideration is set forth in the PWC General Conditions.

G. CONTRACTOR'S LICENSE

1. No General Contractor shall engage in contracting work in the State of North Carolina unless it has been licensed under in accordance with North Carolina law.

2. Bidders are prohibited from contracting for, or bidding upon, the construction, removal, repair or improvements to or upon real property owned, controlled or leased by Fayetteville Public Works Commission without a North Carolina Contractor's License.

3. Each bidder shall indicate its North Carolina Contractor's License number on the bid envelope and the Bid Form.

4. License Classification shall be:

   Public Utilities - Unlimited

H. SUBCONTRACTORS

1. Contractor shall subcontract no more than 49 percent (49%) of the value of the Contract.

2. Each Bidder shall submit to PWC with its bid the List of Subcontractors, Suppliers, other persons, and organizations proposed for those portions of the Work for which such identification is required. If PWC, after due investigation has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, PWC may, before Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute without an increase in the Bid.

3. If the apparent Successful Bidder declines to make such a substitution, PWC may award the Contract to the next lowest responsive, responsible Bidder that proposes to use acceptable Subcontractors, Suppliers, and other persons, and organizations. The declining to make requested substitutions will not constitute grounds for sacrificing the bid security of any Bidder. If PWC does not make written objection to a Bidder’s list of Subcontractors, Suppliers, other persons, or organizations prior to giving Notice of Award, the list will be considered acceptable, subject to revocation as provided in the PWC General Conditions.

I. MINORITY, WOMEN, DISADVANTAGED BUSINESS ENTERPRISE (MWDBE) PROGRAM / SMALL LOCAL SUPPLIER (SLS) PROGRAM :

1. PWC is committed to promoting the utilization of Minority, Women, and Disadvantaged Businesses in PWC's geographical statistical area (GSA) by providing equal opportunity for participating in all aspects of PWC's contracting and procurement programs. The GSA consists of NCDOT division areas 3-8, and 10. PWC is also committed to promoting the utilization of small, local businesses in the Fayetteville Metropolitan Statistical Area (MSA) by increasing opportunities for those businesses to participate in PWC procurements. The MSA consists of Cumberland County, Hoke County, and Harnett County.
2. PWC requires Bidders to report efforts to utilize Minority, Women, and Disadvantaged Business Enterprises (MWDBEs) and Historically Underutilized Businesses (HUBs) for specific projects and requires all Bidders to report all such efforts for MWDBEs, HUBs, and Small Local Suppliers regardless of the requirements of a specific project. Bidders shall document any good-faith efforts and utilization in the MWDBE forms provided within the Contract Documents.
3. NCDOT Disadvantaged Business Enterprise (DBE) and NC Department of Administration (DOA) Historically Underutilized Business (HUB) firms with current certifications are acceptable for listing in the bidder's submittal of MWDBE participation and will be considered to meet any necessary contract goal. Firms that are certified through NCDOT are listed in the "Vendor Directory" which can be accessed through the following: https://www.ebs.nc.gov/VendorDirectory/default.html. Firms that are certified through NC DOA are listed at the "Vendor Search" which can be accessed through the following link: https://evp.nc.gov/vendors/vendorsearchadvanceform/?id=d98aa5d6-0d57-ee11-be6e-001dd804e775 .
4. Bidders shall submit, with their bid, the MWDBE documentation required in the Contract Documents. The Bidder is strongly recommended to attend the Pre-Bid Meeting, as important information will be reviewed.

J. SUBMISSION OF BIDS

1. All Bidders shall use the enclosed Bid Forms, or exact copies thereof, in submitting their bid prices. PWC will not accept oral Bids or Bids received by telephone, email, or telecopier (FAX machine) for this Bid.
2. All prices must be F.O.B. delivered to the point as indicated by this Bid. PWC will grant no allowance for boxing, crating, or delivery unless specifically provided for in this Bid.
3. The Bid Form must be completed in black ink. Black or blue pen ink is acceptable if handwritten. Discrepancies between amounts shown in words and amounts shown in figures will be resolved in favor of the amounts shown in words. Discrepancies in the multiplication of units of Work and the unit prices will be resolved in favor of the correct multiplication of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

4. Bid submittals sent by mail should be registered mail. The sealed Bid, marked as indicated above, should be enclosed in an additional sealed envelope similarly marked and addressed to:

   Fayetteville Public Works Commission
   Attn: Victoria McAllister, Procurement Manager
   955 Old Wilmington Road
   Fayetteville, North Carolina 28301

5. Mark the envelope in the lower left-hand corner with the project title, hour and due date of Bid, and the Bidder's North Carolina contractor registration number.
6. Bids sent by mail and arriving after the time for the opening of Bids shall not be considered valid Bids. In such instances, the Bidders shall have no claim against PWC.
7. All items contained in the Bid Checklist shall be completely filled out and submitted with the bid. Failure to submit any of the items requested with the Bid Form may be just cause for rejection of the Bid by PWC.
8. All erasures, insertions, additions, and other changes made by the Bidder to the Bid Form shall be signed or initialed by the Bidder. Bids containing any conditions, omissions, erasures, alterations, or items not called for in the Bid, may be rejected by PWC as being incomplete or nonresponsive.
9. The Bid Form must be signed in order to be considered. If the Bidder is a corporation, the Bid must be submitted in the name of the corporation, not simply the corporation's trade name. In addition, the Bidder must indicate the corporate title of the individual signing the Bid.
10. The Bid Form, the Bid security, if any, and any other documents required, shall be enclosed in a sealed opaque envelope. Any notation or notations on the exterior of the envelope purporting to alter, amend, modify, or revise the bid contained within the envelope shall be of no effect and shall be disregarded.
11. All Bids received in the Procurement Department by the deadline indicated will be kept sealed until the time and date of the Bid Opening.
12. All late Bids shall be returned unopened to the sender.

K. BID BOND

1. Each Bid shall be accompanied by an acceptable Bid bond in the amount of five percent (5%) of the Bid amount, and made payable to Fayetteville Public Works Commission, North Carolina.
2. The Bid bond is a guarantee that if the contract is awarded by PWC to the Bidder, the Bidder shall enter into the contract with PWC for the work mentioned in this Bid or forfeit the Bid bond to PWC, not as a penalty, but as liquidated damages.
3. No forfeiture under a Bid bond shall exceed the lesser of (a) the difference between the Bid forwhich the Bid bond was written and the next low Bid of another Bidder, or (b) the

face amount of the Bid bond.

4. All bonds shall be executed by a surety company selected by the Bidder, which is legally authorized to do business in the State of North Carolina (NCGS §44 A-26), and the bond shall be the same in both form as well as substance as AIA Document A310, Bid Bond.
5. The Bidder shall require the attorney-in-fact, who executed the required bond on behalf of the surety company, to affix thereto a certified and current copy of the power of attorney.
6. The bond premium shall be paid by the Bidder and the cost shall be included in the Bid price.
7. Any inspection of procurement transaction records shall be subject to reasonable restrictions to ensure the security and integrity of the records.

L. OPENING OF BIDS

1. Bids will be opened publicly and read aloud on the date and time set for the Bid Opening in the Notice to Bidders.
2. Any Bidder, upon request, shall be afforded the opportunity to inspect Bid records within a reasonable time after the opening of all Bids but prior to award, except in the event that PWC decides not to accept any of the Bids and to reopen the contract. Otherwise, bid records shall be open to public inspection only after the award of the Contract.
3. Any inspection of procurement transaction records shall be subject to reasonable restrictions to ensure the security and integrity of the records.

M. MODIFICATION OF BIDS

1. A Bid may be modified or withdrawn by the Bidder at any time prior to the time and date set for the Bid Opening. The Bidder shall notify the PWC Procurement Department in writing of its intentions.
2. Modified and withdrawn Bids may be resubmitted to the PWC Procurement Department up to the time and date set for the Bid Opening.

N. WITHDRAWAL OF BID DUE TO ERROR

1. If the Bidder desires to withdraw its Bid, the Bidder must do so before the time fixed for the opening, without prejudice, by communicating its purpose in writing to PWC. After bids are open, bids may only be withdrawn in strict accordance with N.C.G.S. Section 143-129-1

O. BIDS TO REMAIN OPEN

1. All Bids shall remain open for ninety (90) calendar days after the day of the Bid Opening.

P. ESTIMATED QUANTITIES

1. The estimated quantities contained herein in certain items in the Bid are for the purpose of comparing bids, and while they are believed to be close approximations, they are not guaranteed, and settlement will be made on the basis of the work as actually executed

at the unit prices in the Bid as accepted. PWC further reserves the right to delete any single line item or combination of items from the bid and cannot guarantee that all quantities listed in the Contract Documents will be utilized.

2. The Contractor should verify quantities before submitting a bid. Due to conditions that may be found under pavement such as the accurate location of existing water lines, sewer lines, gas lines, and structure services of all types, quantities are subject to change during construction, but this contingency shall not be used for a claim to change unit prices submitted in the Bid.

Q. AWARD OF CONTRACT

1. PWC reserves the right to reject any and all Bids, to waive any and all informalities, and to disregard all nonconforming, nonresponsive, or conditional Bids. PWC reserves the right to request additional information from any or all bidders for evaluation purposes. Failure or refusal to furnish additional information as requested may result in the rejection of the bid.
2. In case of a tie Bid, the tie shall be decided by lot.
3. It is the intent of PWC to recommend the award of this contract to the lowest responsive, responsible Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. In determining the lowest responsible Bidder, PWC may consider, among other criteria, the Bidder's past performance conduct on other contracts, and other information provided by the Bidder as noted below.
4. In determining the lowest responsive Bidder, PWC will evaluate the Bidder’s proposed Bid price and the completeness of the submitted bid in accordance with the requirements of the Contract Documents.
5. PWC may consider the operating costs, maintenance considerations, performance date, and guarantees of materials and equipment.
6. PWC may conduct such investigations as deemed necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Bidders, as well as other considerations, to include but not limited to resources available to the Bidder to perform the work effectively, proposed Subcontractors and other persons and organizations to do the workin accordance with the Contract Documents to PWC’s satisfaction within the prescribed time.
7. PWC reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to PWC’s satisfaction.
8. If the Contract is to be awarded, PWC will give the Successful Bidder a Notice of Award within ninety (90) days after the day of the Bid Opening.
9. The Bidder to whom the contract is awarded shall, within ten (10) days after prescribed documents are presented for signature, execute and deliver the Contract Documents and any otherforms or bonds required by the Bid to PWC.

10. The Bidder is required to complete the attached forms that will allow PWC to verify that the Bidder is qualified to perform the Work described in these Contract Documents. All forms shall be completed and submitted with the Bid. Failure to submit all the required forms shall be considered grounds for PWC to reject the bid.

    PWC will review all of the bids and qualification data to determine the lowest responsive, responsible Bidder. PWC reserves the right to not award the Contract to the lowest bidder if the information provided is not complete, does not meet the satisfaction of PWC, or has been falsified. PWC will not request any additional information in order to allow the Contractor to complete bid.

11. During the evaluation phase, bid submittals will be reviewed to ascertain which bids technically and otherwise address all the requirements of these Contract Documents. Bid submittals determined to be technically non-responsive or not sufficiently responsive may be disqualified.

    The Bidder shall address each of the Evaluation Criteria as requested in the Technical Evaluation Criteria Form located within Section A Project Specifics Bid Submittal Documents. To be considered substantive, the information must respond to all requirements.

12. PWC may conduct such investigations/verifications as deemed necessary to establish the responsibility, qualification and financial ability of the Bidder. Should PWC find that the apparent low bidder is not the lowest responsive, responsible bidder by integrity of the information furnished, said apparent low bidder will be so notified and its bid bond shall be returned without prejudice. Failure or refusal to furnish any items of information requested by PWC shall be considered as non-responsive and therefore basis for rejection of the bid.

R. TAXES

1. The Successful Bidder shall pay all county, city, state and federal taxes required by laws in effect at the time Bids are received and resulting from the Work or traceable thereto, under whatever name levied.

2. Said taxes shall not be in addition to the contract price between PWC and the Successful Bidder. The taxes shall be an obligation of the Successful Bidder and not of PWC. PWC shall be held harmless from same by the Successful Bidder.

S. PERFORMANCE AND OTHER BONDS

1. The PWC General Conditions set forth PWC's requirements as to Performance and other Bonds.

T. E-VERIFY REQUIREMENTS

1. Contractor hereby acknowledges that “E-Verify” is the federal E-Verify program operated by the US Department of Homeland Security and other federal agencies which is used to verify the work authorization of newly hired employees pursuant to federal law and in accordance with Article 2, Chapter 64 of the North Carolina General Statutes.

2. Contractor further acknowledges that all employers, as defined by Article 2, Chapter 64

of the North Carolina General Statutes, must use E-Verify and after hiring an employee to work in the United States, shall verify the work authorization of the employee through E-Verify in accordance with NCGS §64-26(a).

3. Contractor hereby pledges, attests and warrants through execution of this Agreement that Contractor complies with the requirements of Article 2, Chapter 64 of the North Carolina General Statutes and further pledges, attests and warrants that any subcontractors currently employed by or subsequently hired by Contractor shall comply with any and all E-Verify requirements. Failure to comply with the above requirements shall be considered a breach of this Agreement.

U. IRAN DIVESTMENT ACT

1. As mandated by N.C.G.S. 147-86.59(a), the Contractor hereby certifies that it is not listed on the Final Divestment List created by the North Carolina State Treasurer pursuant to N.C.G.S. 147-86.58. Contractor further certifies that in accordance with N.C.G.S. 146-86.58(b) that it shall not utilize any subcontractor found on the State Treasurer's Final Divestment List. Contractor certifies that the signatory to this Purchase Order authorized by the Contractor to make the foregoing statement.

*** END OF SECTION ***

SECTION A – PROJECT SPECIFICS
BID SUBMITTAL DOCUMENTS

BID SCHEDULE – PERFORMANCE AND DELIVERY
FAYETTEVILLE PUBLIC WORKS COMMISSION
P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT

Pre-Bid Meeting:	1:00 P.M. ET, Thursday, January 4, 2024
(MANDATORY)	Fayetteville Public Works Commission Administrative Building Skills Lab 955 Old Wilmington Road Fayetteville, NC 28301
Deadline for Questions from Bidders[1]	5:00 P.M. ET, Monday, January 8, 2024
Deadline for Addenda issued by PWC Procurement Department and Project Engineer[2]	5:00 P.M. ET, Thursday, January 11, 2024
Bid Opening (Submittal Deadline)	1:00 P.M. ET, Thursday, January 18, 2024 Fayetteville Public Works Commission Administrative Building Conference Room 107 955 Old Wilmington Road Fayetteville, NC 28301
Contract Time:	From Notice to Proceed until September 30, 2024
Liquidated Damages:	$500.00 per day for each day beyond the Final Completion Date
Bid Acceptance Period	Within ninety (90) Calendar Days unless otherwise noted

1. Questions regarding this bid must be submitted in writing to the attention of Victoria McAllister, Procurement Manager, by email to procurement@faypwc.com.

   Bidders are expressly prohibited from contacting any FPWC official or employee associated with this Invitation to Bid, except as noted above. Violation of this prohibition is grounds for the immediate disqualification of the bidder.

2. Any addenda to these Contract Documents will be issued by the Project Engineer no later than the date and time stated above.

BID SUBMITTAL CHECKLIST

- ☐ 1. Enter Contractor's License Number where called for in the Bid Form and on the outside of the sealed envelope containing the Bid.
- ☐ 2. Photocopy of Contractor's License.
- ☐ 3. Bid Bond
- ☐ 4. Bid Forms Section 00300.
- ☐ 5. Provide the responsible North Carolina Registered Agent for Insurance Claims. Include contact information.
- ☐ 6. Provide the proposed responsible Bonding Company name. Include contact information.
- ☐ 7. List of proposed Subcontractors and material suppliers exceeding 5% of the Contract Value.
- ☐ 8. Non-Collusive Affidavit.
- ☐ 9. Nondiscrimination Clause.
- ☐ 10. Affidavit of Organization and Authority and Sworn Statement.
- ☐ 11. Equal Employment Opportunity Acknowledgment.
- ☐ 12. Certification regarding Debarment, Proposed Debarment, and other Responsible Matters.
- ☐ 13. FTA Certification Regarding Lobbying.
- ☐ 14. Identification of Minority Business Participation Form.
- ☐ 15. Affidavit A – Listing of Good Faith Efforts, et al.
- ☐ 16. Affidavit B – (Only if the Contractor will perform **ALL ELEMENTS OF THE WORK** on this project with their own forces **AND** will complete **ALL ELEMENTS OF THIS PROJECT WITHOUT THE USE OF SUBCONTRACTORS, MATERIAL SUPPLIERS, OR PROVIDERS OF PROFESSIONAL SERVICES**.
- ☐ 17. SLS Disclosure Form
- ☐ 18. Proposed Project Management Staff
- ☐ 19. References
- ☐ 20. Proposed Construction Schedule

FAILURE TO SUBMIT THE ABOVE FORMS WITH THE BID FORM MAY BE JUST CAUSE FOR REJECTION OF THE BID BY THE OWNER

*** THIS PAGE INTENTIONALLY LEFT BLANK ***

00300 - BID FORM

TO: **Fayetteville Public Works Commission**
Attn: Victoria McAllister, Procurement Manager
955 Old Wilmington Road
Fayetteville, North Carolina 28301

PROJECT: **P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT**

FROM: BIDDER _____

ADDRESS _____

_____

DATE OF BID _____ , 20 ____

A. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into a Contract with OWNER in the form included in the Contract Documents to perform and furnish all Work (as that term is defined in the Construction Agreement) specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.

B. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including, without limitation, those dealing with the disposition of payment and performance bonds, and insurance certificates. This bid will remain open for ninety (90) calendar days after the day of Bid opening. BIDDER will sign the Contract and submit the Contract Security and other documents required by the Contract Documents within ten (10) days after the date of receipt by the BIDDER.

C. In submitting this Bid, Bidder represents, as more fully set forth in the Contract, that:

1. BIDDER has examined copies of all the Contract Documents and of the following addenda, receipt of all which is acknowledged on the bid summary page:

2. BIDDER has examined the site and locality where the Work is to be performed, the legal requirements (federal, state, and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress of performance of the work and has made such independent investigations as BIDDER deems necessary.

3. BIDDER acknowledges that OWNER does not assume responsibility for the accuracy of dimensions or completeness of information and data shown or indicated in the Bidding Documents with respect to existing facilities.

4. BIDDER has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site of the Work (expect underground facilities)

and all drawings of physical conditions in or relating to existing surface or subsurface structures, pipelines, and utilities at or contiguous to the site are provided within these Contract Documents. Geotechnical Reports and other information regarding subsurface conditions are identified in the attached appendices and detailed in Article V of the PWC General Conditions. BIDDER acknowledges that the OWNER does not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to underground facilities at or contiguous to the site of Work. BIDDER had obtained and carefully studied (or assumes responsibility for have done so) all such additional or supplementary examinations investigations, explorations, tests, studies, and data that are necessary to identify and understand conditions (surface, subsurface, and underground facilities) at or contiguous to the site of Work or otherwise which may affect cost, progress, performance, or furnishing the Work or which relate to any aspect of means, methods, techniques, sequences, and procedures of construction to be employed by Bidder and safety precautions and programs incident thereto. BIDDER waives all rights to claim that any additional examinations, investigations, explorations, tests, studies, or data are necessary for the proper submission of the Bid for the performance and furnishing of the Work in accordance with the Contract Time, Contract Price, and other terms and conditions of the Contract Documents.

5. BIDDER hereby certifies that, if awarded the Contract for construction of the Project, it will take all possible actions to minimize costs to the OWNER which are related to any disruptions in any part of the Work resulting from unforeseeable conditions which may be encountered and work changes or additions which may be made.

6. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, exploration, tests, studies, and data with the Contract Documents.

7. BIDDER has given OWNER written notice of all conflicts, errors, ambiguities, or discrepancies that BIDDER has discovered in the Contract Documents and the written resolution thereof by OWNER is acceptable to BIDDER, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.

8. By bidding in response to this invitation, the BIDDER represents that in the preparation and submission of this Bid, said BIDDER did not, either directly or indirectly, enter into any combination or arrangement with any person, firm or corporation or enter into any agreement, participate in any collusion, or otherwise take any action in the restraint of free, competitive bidding in violation of the Sherman Act (15 U.S.C. Section 1).

9. Bid form must be completed in blue or black ink or by typewriter. The Bid price of each item on the form must be stated in both words and numerals. In case of a conflict, words shall take precedence. Discrepancies in the multiplication of units of work and unit prices will be resolved in favor of the correct multiplication of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

10. BIDDER understands that the award of contract will be made on the basis of the total Bid amount which will be determined as the sum of the unit price and lump sum Bid Items.

11. BIDDER understands that quantities are estimated and are not guaranteed; they are solely for comparing Bids and establishing the total Bid amount. The Price will be modified by Change Order, and final payment will be based on the quantities of work actually furnished and installed by the successful BIDDER.

12. BIDDER shall complete the Work for the prices indicated on the next page.

P.O. HOFFER SUBSTATION
LABOR AND MATERIAL PROPOSAL

BIDDER_____

ITEM	DESCRIPTION	QTY	UNIT	UNIT PRICING		LABOR AND MATERIAL EXTENDED COST
				LABOR	CONTRACTOR-FURNISHED MATERIAL	
3.1	Structures	1	LOT			
3.2	Three-pole Group Operated Airbreak Switches	1	LOT			
3.3	Lightning Arresters	1	LOT			
3.4	Single-Pole Disconnecting Switches	1	LOT			
3.5	Circuit Breakers	1	LOT			
3.7	Instrument Transformers	1	LOT			
3.8	Power and Station Service Transformers	1	LOT			
3.10	Communications & Supervisory Control Panel	1	LOT			
3.11	Conduit & Cable	1	LOT			
3.12	Foundations	1	LOT			
3.13	Site Preparation	1	LOT			
3.14	Fence	1	LOT			
3.15	Station Grounding	1	LOT			
3.16	Building	1	LOT			
3.17	Batteries	1	LOT			
3.18	Oil Containment System	1	LOT			
3.19	Protective Relaying Panel	1	LOT			
3.21	Testing	1	LOT			
3.23	Underground Circuit Plan	1	LOT			
4.0	Removals and Disposals	1	LOT			
	TOTAL LABOR AND MATERIAL COST:			$	$ -	
					TOTAL INSTALLATION:	

P.O. HOFFER SUBSTATION
UNIT PRICING PROPOSAL

BIDDER _____

DESCRIPTION	LABOR	MATERIAL	TOTAL
COST PER INSTALLED CUBIC YARD OF CONCRETE			
Augured-Pier Type Foundation			
Pad-Type Foundation			
COST PER INSTALLED POUND OF REBAR			
COST PER LINEAR FOOT OF GROUND WIRE DITCH			
Machine Excavate			
Hand Excavate			
COST PER INSTALLED 10-FOOT GROUND ROD			
COST PER LINEAR FOOT OF GROUND WIRE IN PRE-EXCAVATED DITCH			
COST PER EXOTHERMIC WELD ON GROUND WIRE / ROD			
COST PER LINEAR FOOT OF CONTROL CABLE CONDUIT DITCH (MACHINE EXCAVATE)			
COST PER LINEAR FOOT OF CONTROL CABLE CONDUIT DITCH (HAND EXCAVATE)			
COST PER LINEAR FOOT OF PVC CONDUIT			
1 inch PVC			
2 inch PVC			
4 inch PVC			
6 inch PVC			
COST PER INSTALLED LINEAR FOOT OF CONTROL CABLE IN CONDUIT / CABLE TRENCH			
COST PER INSTALLED LINEAR FOOT OF CONTROL CABLE IN CABLE TRAY (INCLUDING SECURING CABLE TO TRAY)			
CONTROL CABLE TERMINATIONS			
COST PER INSTALLED TON OF COMPACTED CRUSHER RUN STONE			
COST PER INSTALLED TON OF ASTM NO. 57 STONE			
COST PER INSTALLED CUBIC YARD OF MULCH			
COSTS FOR FIELD CORRECTION OF MISFAB AS LISTED BELOW. WORK TO BE APPROVED IN ADVANCE BY OWNER. PRICE TO INCLUDE PAINTING OF PUNCHED OR CLIPPED STEEL SURFACES WITH FALVANOX PAINT			
Clipping angles or flat stock			
Punching or drilling per hole			
Punching or drilling and tapping per hole			
Reaming per hole			
ROCK EXCAVATION - COST PER CUBIC YARD			
FOUNDATIONS			
Augured-Pier Type			
Pad-Type			
Ground Grid / Conduit Ditch			
Oil-Containment Basin			

LABOR			
DESCRIPTION	HOURLY RATE		
	REGULAR	OVERTIME	
Supervisor			
General Foreman			
Foreman			
Journeyman Lineman / Wireman			
Equipment Operator			
Groundman			

EQUIPMENT			
DESCRIPTION	UNIT (per day, hour, week)	COST	
Pickup Truck			
Backhoe			
Bucket Truck - 46' - 55'			
Bucket Truck - 60' +			
Trencher			
Air Compressor			
Crane Truck - 15 Ton			
All-Terrain Crane - 18 Ton			

- BID SUMMARY-

TOTAL BASE BID **$_____**

The BIDDER has received, acknowledged, and used the following addenda in completing the Bid. (Initial and Date as appropriate).

Addendum No. 1	Date _____
Addendum No. 2	Date _____
Addendum No. 3	Date _____
Addendum No. 4	Date _____
Addendum No. 5	Date _____
Addendum No. 6	Date _____
Addendum No. 7	Date _____

The undersigned BIDDER _____ (Contractor Name) certifies that they are licensed as a Contractor under N.C.G.S **§** 87, and that their license number is_____ (License Number).

The undersigned BIDDER hereby agrees to accept an award of the Contract based on the Total Contract Amount as accepted by the OWNER and as indicated on the Notice of Award.

A. BIDDER agrees that Work shall be completed within the time frame indicated in the Agreement as follow:

    1. All work described herein to be complete, including restoration and all punch list items from Notice to Proceed until September 30, 2024.

    2. The BIDDER acknowledges that time is of the essence in this Contract and that the OWNER will suffer financial loss if the Work is not complete within the time specified in Paragraph D.1 above plus any extensions thereof allowed in accordance with these Contract Documents. BIDDER also recognizes the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by the OWNER if the Work is not complete on time. The Bidder agrees to diligently pursue all available work and complete all work in an expeditious manner.

B. The following documents are attached to and made part of this bid:

    Required Bid Security in the form of either a cashier's check or certified check or Bid Bond in the amount of 5% of maximum Bid price.

C. Communications concerning this Bid shall be addressed to: (CONTRACTOR's Name, Address and Telephone Number)

    _____
    _____
    _____
    _____
    _____

D. The terms used in this Bid which are defined in Definitions and Terminology Section of the PWC General Conditions or as otherwise specifically defined in the Contract Documents have the meanings assigned to them therein, which are incorporated by reference as if fully set forth herein.

E. An individual contractor is required to furnish his social security number and sole proprietorship, partnership and corporation are required to furnish their employer identification numbers to Fayetteville Public Works Commission. Please indicate this information on this Bid Form as follows:

    Social Security Number: _____

    Federal Employer Identification Number: _____

SUBMITTED ON ____day of_____2024

AN **INDIVIDUAL**

BY:_____(SEAL)

(Individual's Name and Signature)

Doing Business as: _____

North Carolina Contractor Registration Number:_____

Business Address:_____

Phone Number: _____

Subscribed and sworn to before me this____day of_____2024

_____

NOTARY PUBLIC

My Commission Expires: _____

A **PARTNERSHIP**

BY:_____(SEAL)

(Firm Name)

(General Partner and Signature)

North Carolina Contractor Registration Number:_____

Business Address:_____

Phone Number: _____

Subscribed and sworn to before me this____day of_____2024

_____

NOTARY PUBLIC

My Commission Expires: _____

A **CORPORATION**

BY: _____ _____

(Corporation Name) (State of Incorporation)

BY:_____(SEAL)

(Name and Title of Person Authorized to Sign and Signature)

ATTEST: _____

(Secretary or Assistant Secretary and Signature)

North Carolina Contractor Registration Number:_____

Business Address:_____

Phone Number: _____

Subscribed and sworn to before me this____day of_____2024

_____

NOTARY PUBLIC

My Commission Expires: _____

A **JOINT VENTURE**

BY:_____

(Name and Signature)

Doing Business as: _____

North Carolina Contractor Registration Number:_____

Business Address:_____

Phone Number: _____

Subscribed and sworn to before me this____day of_____2024

_____

NOTARY PUBLIC

My Commission Expires: _____

(Each joint venturer must sign. The name of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

PROPOSED PROJECT MANAGEMENT STAFF

Title/Function	Name	Years with Firm	Total Years Experience
Project Manager			
Site Superintendent			
General Foreman - Structures			
General Foreman - Foundations			
General Foreman – Controls			

_____(CONTRACTOR) _____ (HAS/DOES NOT HAVE) SIXTY PERCENT (60%) OF PROPOSED WORK FORCE WITH FIVE (5) YEARS CONTINUOUS SERVICE WITH BIDDER'S FIRM.

REFERENCES

CONTACT INFORMATION FOR RECENT SIMILAR PROJECTS

Owner Name	Project Description	Contact Name and Phone Number

LIST OF SUBCONTRACTORS

In compliance with the Instructions to Bidders and the Supplementary Conditions, the undersigned submits the following names of Subcontractors to be used in performing the Work.

The Bidder certifies that all Subcontractors listed are eligible to perform the Work and that all Subcontractors performing more than five percent of the work are listed.

Subcontractor's Work	Subcontractor's Name

Bidder's Signature

INSERT

PROPOSED CONSTRUCTION SCHEDULE

BID BOND

This is a Bid Bond that is subject to the provisions of Article 3 of Chapter 44A of the North Carolina General statutes.

This Bond is executed on _____ , 20 _____ .

The name of the PRINCIPAL is _____ (1)

_____ (2)

The name of the SURETY is _____

_____

Fayetteville Public Works Commission, Fayetteville, North Carolina is the OWNER

The amount of the Bond is _____

_____ (Dollars) ($ _____)

KNOW BY ALL MEN BY THESE PRESENTS, the Principal and Surety above named are hereby held and firmly bound unto the above named OWNER hereinafter called the OWNER in the penal sum of the amount stated above in lawful money of the United States, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the OWNER a certain Bid, attached hereto and hereby made a part hereof to enter into a Contract in writing, for the construction of:

P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT

NOW, THEREFORE

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Bid shall be accepted and the Principal shall execute and deliver a Contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

ATTEST:

(Principal Secretary) (SEAL)	Principal
	BY: (3)
	(Address)
Witness as to Principal	Surety
(Address)	(Address)

ATTEST:

N.C. Resident Agent
(SEAL)

Witness as to Surety

(Address)

(1) Correct name of Contractor
(2) A Corporation, a Partnership or an Individual, as the case may be
(3) If Contractor is a Partnership, all partners should execute Bond

POWER OF ATTORNEY
(Attach)

AFFIDAVIT OF ORGANIZATION AND AUTHORITY SWORN STATEMENT
P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT

STATE OF _____

COUNTY OF _____

_____being the first duly sworn on oath deposes and says that the Bidder on the attached Bid Form id organized as indicated below and that all statements herein made are made on behalf of such Bidder and that this deponent is authorized to make them.

(Fill Out Applicable Paragraph)

1. CORPORATION

The bidder is a corporation organized and existing under the laws of the State of _____ and its President is_____, and its Secretary is _____, and does have a corporate seal. The _____ is authorized to sign construction Contract and Bids for the company by action of its Board of Directors taken _____, a certified copy of which is hereto attached. (Strike out last sentence if not applicable.)

2. PARTNERSHIP

The Bidder is a Partnership consisting of_____ and _____, partners doing business under the name of _____.

3. SOLE TRADER

The Bidder is an individual and if operating under a trade name, such trade name is as follows: _____

4. ADDRESS

The business address of the Bidder is as follows:

_____

_____

_____ Its phone number is _____

_____

Bidder

By: _____

EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this Contract the Contractor agrees as follows:

a. The Contractor will not discriminate against any employee or applicant because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to race, color, religion, sex, or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of the nondiscrimination clause.

b. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

c. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract understanding, a notice, to be provided, advising the labor union or worker's representative of the Contractor's commitments under the Equal Employment Opportunity Section of this Contract, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

d. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further OWNER Contracts.

e. The Contractor will include the provisions of this section in every subcontract or purchase order unless exempted by rules, regulations, or orders of the OWNER so that such provisions will be binding upon each Subcontractor or vendor.

(Use the following form for signatures by a CORPORATION):

_____
Corporate Name

ATTEST:

_____ _____
(Assistant) Secretary (Vice) President

(CORPORATE SEAL)

(Use the following form for signatures by and INDIVIDUAL):

BY: _____ (Seal)

WITNESS:

_____

(ACKNOWLEDGEMENT OF THE ABOVE SIGNATURE MUST BE NOTARIZED USING FORM ON FOLLOWING PAGE)

NONDISCRIMINATION CLAUSE

It is specifically agreed as part of the consideration of the signing of this Contract that the parties hereto, their agents, officials, employees or servants will not discriminate in any manner on the basis of age, handicap, race, color, creed, sexual orientation or national origin with reference to the subject matter of this Contract, no matter how remote.

This provision being incorporated for the benefit of Fayetteville Public Works Commission, Fayetteville, North Carolina and its residents may be enforced as set out in said ordinances, enforcement of this provision shall be by action for specific performance, injunctive relief, or other remedy as by law provided.

This provision shall be binding on the successors and assigns of the parties hereto with reference to the subject matter of this Contract.

(Use the following form for signatures by a CORPORATION):

_____
Corporate Name

ATTEST:

_____ BY: _____
(Assistant) Secretary (Vice) President

_____ BY: _____
(Printed Name) (Printed Name)

(Corporate Seal)

(Use the following form for signatures by a PARTNERSHIP or INDIVIDUAL):

BY:_____(SEAL)

_____
(Printed Name)

WITNESS:

_____

_____
(Printed Name)

NON-COLLUSIVE AFFIDAVIT

State of_____)
)
County of _____)

_____being first duly sworn, deposes and says that:

(1) He is the_____
(Owner, Partner, Officer, Representative or Agent)
of_____the BIDDER that has submitted the attached BID;

(2) He is fully informed respecting the preparation and contents of the attached BID and of all pertinent circumstances respecting such BID;

(3) Such BID is genuine and is not a collusive or sham BID;

(4) Neither the said BIDDER nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, have in any way colluded, conspired, connived or agreed, directly or indirectly, with any other BIDDER, firm, or person to submit a collusive or sham BID in connection with the Contract for which the attached BID has been submitted; or to refrain from bidding in connection with such Contract; or have in any manner, directly or indirectly, sought by agreement or collusion, or communication, or conference with any BIDDER, firm, or person to fix the price or prices in the attached BID or of any other BIDDER, or to fix any overhead, profit, or cost elements of the BID price or the BID price of any other BIDDER, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against (Recipient), or any person interested in the proposed Contract;

(5) The price or prices quoted in the attached BID are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the BIDDER or any other of its agents, representatives, owners, employees or parties in interest, including this affidavit.

BY _____

ITS _____
(Title)

Subscribed and sworn to before me this _____ day of _____, 20___.

_____
Notary Public

My Commission Expires:

_____

END OF AFFIDAVIT

F.T.A. CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

(To be submitted with each bid or offer exceeding $100,000)

The undersigned ____certifies, to the best of his or her knowledge and belief, that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form--LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et seq* .)]

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such expenditure or failure.]

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. A 3801, *et seq., apply* to this certification and disclosure, if any.

_____ Signature of Contractor's Authorized Official

_____ Name and Title of Contractor's Authorized Official

_____ Date

CERTIFICATION OF PRIMARY PARTICIPANT REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS

The Primary Participant, _____ (major third party contractor), certifies to the best of its knowledge and belief, that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

2. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction or records, making false statements, or receiving stolen property;

3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and

4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(If the primary participant is unable to certify to any of the statements in this certification, the participant shall attach an explanation to this certification.)

THE PRIMARY PARTICIPANT _____ CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET. SEQ. ARE APPLICABLE THERETO.

_____	_____
Signature	Title
_____	_____
Printed Name	Date

*** THIS PAGE WAS INTENTIONALLY LEFT BLANK***

MINORITY, WOMEN, AND DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

for

Construction, A&E Services, Purchase Contracts, Professional Services, and General Services

Contents

PURPOSE

The Fayetteville Public Works Commission (PWC) is committed to promoting the utilization of Minorities, Women, and Disadvantaged Businesses by providing equal opportunity for participating in all aspects of PWC's contracting and procurement programs, including but not limited to, construction projects, A&E services, purchase contracts, and professional and general (other) service contracts.

To achieve this purpose, PWC has established this Minority, Women, and Disadvantaged Business Enterprise Program (MWDBE) to support historically underutilized businesses, encourage capacity development, and offer procurement opportunities to certified business enterprises.

OVERVIEW

PWC's MWDBE Program is a voluntary goals program in construction, A&E services, purchase contracts, and professional and general (other) services based on "good-faith efforts." These goals are established for a five-year period and achievement will be evaluated annually.

The aspirational goals of PWC for the utilization of Minority, Women, and Disadvantaged Business Enterprises are:

Minority business participation in construction services	14%
Women business participation in construction services	11%
Minority business participation in A&E services	6%
Women business participation in A&E services	5%
Minority business participation in purchase contracts	4%
Women business participation in purchase contracts	4%
Minority business participation in professional services	19%
Women business participation in professional services	3%
Minority business participation in general (other) services	9%
Women business participation in general (other) services	4%

I. INTRODUCTION

In 2021, Fayetteville Public Works Commission (PWC) contracted with Griffin & Strong, P.C. (GSPC) to conduct a Disparity Study to determine the effectiveness of the current policies related to local, minority, and women owned businesses and to recommend modifications and adjustments, if necessary, to PWC's policies that comply with the law.

PWC continues to implement race and gender conscious and race and gender-neutral measures to try to increase utilization of Minority, Women, and Disadvantaged Business Enterprise (MWDBE) firms. PWC has a basis to continue race and gender conscious remedies or policies toward achieving annual aspirational goals.

The MWDBE aspirational goals and guidelines developed and recommended do not require nor provide for racially based set-asides; rather they require good-faith effort by both local government and contractors to recruit and select minorities and women businesses, consistent with North Carolina Statues and the Constitution of the United States as interpreted by the Croson Decision.

II. ADMINISTRATION

PWC General Manager/CEO is authorized to take all usual and legal administrative actions necessary to implement this Program. The ultimate responsibility for the MWDBE Program administration is assigned to the PWC General Manager/CEO or its designee. PWC General Manager/CEO or its designee is either to be personally responsible or to designate a specific person to coordinate and manage this Program. PWC General Manager/CEO or its designee is responsible for determining whether a contractor has complied with this Program and shown good-faith efforts to do so. Except for those staff services specifically assigned by this Program to other departments, the heads of departments responsible for the construction, and procurement of services and goods shall be responsible to PWC General Manager/CEO or its designee and shall cooperate with PWC General Manager/CEO or its designee in implementing this Program.

The MWDBE Program shall apply to all construction contracts, A&E contracts, purchase contracts, and services as specified in Sections IV through VII. The provisions of this Program take precedence over any other department plans or procedures in conflict herewith, except specific requirements mandated by terms or conditions of agreements in force between PWC and the federal government or the State of North Carolina that require different procedures than those described in this Program. This Program will be evaluated at the end of five years to determine its effectiveness and what adjustments are required.

III. DEFINITIONS

Affirmative Action - Specific steps to eliminate discrimination and efforts to ensure nondiscriminatory results and practices in the future, and to fully involve Minority, Women, and Disadvantaged Business Enterprises in contracts and programs.

Aspirational Goal/Goal - A voluntary percentage or quantitative objective.

Bidder/Participant - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.

Contract - A mutually binding legal relationship or any modification thereof obligating the seller to furnish equipment or service, including construction and leases, and obligating the buyer to pay for them.

Contractor - Any person, firm, partnership, corporation, association, or joint venture that has been awarded a public contract or lease, including every subcontract on such a contract.

Day – A calendar day of 24 hours measured from midnight to the next midnight. Also referred to throughout the Program documents as "days or "calendar days."

Discrimination - To distinguish, differentiate, separate and/or segregate on the basis of age, race, religion, color, sex, national origin, handicap and/or veteran status.

Equipment - Includes materials, supplies, commodities, and apparatus.

Joint Venture - An association of two or more businesses to carry out a single business enterprise for profit, for which purpose they combine their property, capital, efforts, skills, and knowledge.

Lessee - A business that leases, or is negotiating to lease, property from PWC or equipment or services to PWC, or to the public on PWC property.

Minority - A person who is a citizen or lawful permanent resident of the United States and who is:

a. Black American (a person having origins in any of the black racial groups of Africa);

b. Hispanic American (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);

c. Portuguese (a person of Portuguese, Brazilian, or other Portuguese culture origin, regardless of race);

d. Asian American (a person having origins in any of the original people of the Far East, Southeast Asia, the Indian sub-continent, or the Pacific Islands); and

e. Native American (a person having origins in any of the original people of North America).

MWDBE - Any certified minority, women, and disadvantaged business enterprise.

Minority, Women, Disadvantaged Business Enterprise (MWDBE) - A business that is at least fifty-one (51) percent owned and controlled by minority group members or women. An MWDBE is **bona fide** only if the minority group or female ownership interests are real and continuing and not created solely to meet the MWDBE requirement. In addition, the MWDBE must itself perform satisfactory work or services or provide supplies under the contract and not act as a mere conduit. In short, the contractual

relationship must also be **bona fide.**

IV. PROCEDURES FOR CONSTRUCTION CONTRACTS

A. Purpose and Application

1. The general purpose of this Program is to help develop and support Minority, Women, and Disadvantaged Business Enterprises (MBE, WBE, and DBE) by providing opportunities for participation in the performance of all construction contracts financed entirely with PWC funds.

2. This Program shall apply to construction contracts when the PWC's estimated contract cost is $100,000 or more, except when a contract is exempt from competitive bidding under the General Statutes of North Carolina. Contracts between $30,000 and $99,999.99 will also be covered by the exemption.

3. Where contracts are financed in whole or in part with federal or state funds, including grants, loans, or other funding sources containing MBE, WBE, DBE Programs, PWC will follow the federal government or the State of North Carolina. PWC General Manager/CEO or its designee will be responsible for monitoring the Program to ensure the goals are met.

4. Since PWC construction contracts are prepared by the Engineering and Facilities Departments, each of these departments shall prepare such documents with Procurement pre-approved templates for the bidding process, which includes the Program goals as required to implement this Program.

    a. Within sixty (60) days of the Commission's approval of this Program, the departmental procedures and contract provisions shall be in effect for all bid documents issued after the date of Commission approval.

B. MWDBE Aspirational Goals

1. To implement the purpose of this Program, the goal shall be to award at least fourteen (14) percent of the total of all construction contract award amounts in each fiscal year to MBE firms and at least eleven (11) percent to WBE firms.

2. PWC General Manager/CEO or its designee may determine that higher or lower goals are appropriate on a project-by-project basis, where it can be shown that the type, size, or location of the project will affect the availability of MBE, WBE, or DBE firms, so long as the aggregate of all contracts does not lower the annual goals.

C. Invitation for Bids

1. Bidders shall submit MWDBE information with their bids. Such information shall be subject to verification by MWDBE Program staff before awarding the contract. The information shall include the names of the MWDBEs to be used and the dollar value of each such MWDBE transaction.

2. Contractors, subcontractors, suppliers, or MWDBE members of a joint venture intended to satisfy the PWC's MBE/WBE/DBE goals shall be certified by the State Department of Transportation (DOT) or North Carolina Office of Historically Underutilized Business (HUB).

D. PWC Responsibilities

1. **MWDBE Directory** – The MWDBE Program staff will establish and maintain a directory of certified Minority, Women, and Disadvantaged Business Enterprises. The purpose of the directory is to provide a resource for prime bidders on PWC construction projects who intend to solicit bids from MBE and WBE subcontractors and suppliers to meet PWC's MBE and WBE goals. The directory will not constitute a recommendation or endorsement of any listed firm.

   The directory will be developed and maintained by the MWDBE Program Staff.

   a. The directory will include:

      i. Business name, address, telephone number, and email address;
      ii. Name(s) of business owner(s);
      iii. Type of license;
      iv. NAICS;
      v. Type of MWDBE certification, and;
      vi. Certification and expiration date with an acceptable agency.

   b. PWC shall advertise on a contract-by-contract basis throughout the year as deemed necessary for MWDBE outreach. Advertisements shall be placed with minority/women-focused publications (state and local). Notification will also be sent to community organizations which might have knowledge of MWDBE firms.

   c. The department heads and MWDBE Program staff should attend local and regional business fairs to promote the MWDBE Program. The departments shall also identify potentially eligible contractors through affirmative action efforts and the normal course of business. The names of identified contractors shall be forwarded to the MWDBE Program staff.

2. **MWDBE Eligibility Standards –** The eligibility of a business is determined by the ownership and control of the business.

   a. An eligible Minority Business Enterprise owner is a citizen or lawful permanent resident of the United States, a member of a recognized ethnic or racial group, and fifty-one (51) percent owner of the business.

   b. The eligible ethnic or racial groups are:

      i. Black/African American
      ii. Hispanic American
      iii. Asian American

iv. Native American

c. An eligible Women Business Enterprise owner is a citizen or lawful resident of the United States and a fifty-one (51) percent owner of the business and is female.

3. **Removal of MWDBE Procedures -** A contractor certified as a MWDBE may be removed from the program directory for, but not limited to, any of the following reasons:

   a. **Change of Status** - PWC General Manager/CEO or its designee may remove a MWDBE if he/she finds that the ownership or control of the business changes so that the business no longer meets the requirements of Section IV, D(2) (b) and (c) above.

   b. **Failure to comply with the MWDBE Program** - The certification of a business as a MWDBE may be removed by PWC General Manager/CEO or its designee if he/she finds any of the following conditions:

      i. That a business has submitted inaccurate, false or incomplete information to PWC;
      ii. That in performance of a contract, a business has failed to comply with requirements of the contract with PWC;
      iii. That in performance of a contract, a business has failed to comply with MWDBE requirements of a contract established by a contractor with PWC in response to PWC requirements; or
      iv. That a business has otherwise failed to comply with the provisions of this MWDBE Program.

   c. **Appeal of Removal -** A business may appeal a determination of a MWDBE by satisfying the eligibility requirements in Section IV, D (2) (b) and (c).

   d. **Pre-bid Meeting or Site Visit -** PWC may hold a pre-bid meeting on formal and informal bid contracts for all prospective bidders, subcontractors, and MWDBEs for the purpose of explaining the provisions of the MWDBE Program, the process for bidding, and the contract to be performed. Available data on MWDBEs interested and/or capable of engaging in the prospective contract shall be made available to prospective bidders, contractors, and subcontractors.

E. Contractor Good-Faith Efforts

The contractor (bidder) shall make good-faith efforts to encourage the participation of MWDBEs in projects prior to submission of bids in order to be considered as a responsive bidder. A good-faith effort shall include, at a minimum, specific affirmative action steps and complete documentation thereof. The following list of factors to determine good-faith effort is not exclusive or exhaustive:

1. Whether the bidder attended any pre-submittal or pre-bid meetings, if scheduled

by PWC;

2. Whether the bidder identified and selected specific items of the project for which the contract could be performed by Minority and/or Women Business Enterprises, to provide an opportunity for participation by those enterprises (including, where appropriate, breaking down contracts into economically feasible units to facilitate MWDBE participation);

3. Whether the bidder advertised, a reasonable time before the date the bids are opened, in one or more daily or minority weekly newspapers or trade associations (i.e., N.C. Minority Business Association), trade journals, or other media;

4. Whether the bidder provided email notice of their interest in bidding on the contract to at least three (3) Minority, Women, or Disadvantaged Business Enterprises (for each identified sub-item of the contract) licensed to provide the specific items of the project a reasonable time prior to the opening of bids;

5. Whether the bidder provided interested Minority, Women, and Disadvantaged Business Enterprises with information about the Plan, specifications, and requirements for the selected subcontracting or material supply work;

6. Whether the bidder contacted PWC's MWDBE Program staff for assistance in identifying minority and women businesses certified with approved public agencies as referenced in Section IV, D (2) (b) and (c);

7. Whether the bidder negotiated in good-faith with Minority, Women, or Disadvantaged Business Enterprises and did not unjustifiably reject as unsatisfactory bids prepared by a Minority, Women, or Disadvantaged Business Enterprises, as defined by PWC;

8. Whether the bidder, where applicable, advised and made efforts to assist interested MWDBEs in obtaining bonds, lines of credit, or insurance required by PWC or contractor;

9. Whether the bidder's efforts to obtain MWDBEs participation could reasonably be expected by PWC to produce a level of participation sufficient to meet the goals of PWC.

Bidders are cautioned that even though their submittal indicates they will meet the MWDBE goals, they should document their good- faith efforts and be prepared to submit this information to protect their eligibility for award of the contract in the event PWC questions whether the good-faith requirement has been met.

10. **Performance of MBE/WBE/DBE Subcontractors and Suppliers** - The MWDBEs listed by the contractor on the Program Affidavits, which is determined by PWC to be certified, shall perform the work and supply the materials for which they are listed unless the contractor has received prior written authorization from PWC to perform the work with other forces or to obtain the materials from other sources.

The contractor shall enter into subcontracts and supply copies of all fully executed subcontracts with each MWDBE listed on the Program Affidavits to PWC's MWDBE Program staff after award of the contract and prior to the issuance of a Notice to Proceed. Any amendments to the subcontracts shall be submitted to the MWDBE Program staff within **five (5) days** of execution.

Authorization to utilize other forces or sources of materials shall be requested by submitting a "Change or Add a Subcontractor Form" for the following reasons:

a. The listed MWDBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract, when such written contract, based upon the general terms, conditions, plans and specifications for the project, or on the terms of such subcontractor's or supplier's written bid, is presented by the contractor.

b. The listed MWDBE becomes bankrupt or insolvent.

c. The listed MWDBE fails or refuses to perform his/her subcontract or furnish the listed materials.

d. The work performed by the listed subcontractor is unsatisfactory according to industry standards and is not in accordance with the plans and specifications; or the subcontractor is substantially delaying or disrupting the progress of the work.

All "Change or Add a Subcontractor Forms" shall be accompanied by good faith efforts documentation as specified on the form.

F. Awarding of Construction Contracts

1. If a construction contract is to be awarded, it shall be awarded in accordance with North Carolina General Statutes to the lowest responsible bidder who complies with all of the prescribed requirements and either:

    a. Made a good-faith effort to comply with these goals and requirements before the time bids are opened as described above. Where a good-faith effort is claimed by the apparent lowest responsible bidder, the bidder shall be required to submit documentation **WITHIN TWENTY-FOUR (24) HOURS OF PWC'S NOTIFICATION**, which in most instances will occur the day of bid opening to show that the criteria for good-faith efforts have been met, or

    b. Once a firm is determined to be an eligible MWDBE, and before the contract is awarded, the total dollar value to be paid to the MWDBE shall be evaluated by the MWDBE Program Staff to ensure that it is in accordance with the bidder's proposal.

If the evaluation shows that the bidder has misrepresented MWDBE participation or has not made a good-faith effort to meet the contract goals for MBE or WBE

participation, the bidder may be disqualified.

G. Counting MWDBE Participation Toward Meeting the Aspirational Goals

The degree of participation by MWDBE contractors, subcontractors, suppliers, or joint-venture partners in contract awards shall be counted in the following manner:

1. Once a firm is determined to be an eligible MWDBE contractor in accordance with this Program, the total dollar value of the contract awarded to the MWDBE is counted as participation.

2. The goals can be met by any certified MWDBE contractor, subcontractor, supplier, trucker, or joint-venture partner as listed in PWC and agency directory. All MWDBEs used to meet the goal must be certified by an approved agency and verified by PWC at the time of bid opening. Only certified firms can be counted toward the goal. The standard for certification is set forth in this Program.

3. The total dollar value of a contract with a disadvantaged business owned and controlled by a minority woman is counted toward either the minority goal or the goal for women, but not toward both. The contractor or MWDBE Program staff may choose the goal to which the value is applied.

4. In the case of a joint venture, the joint venture recipient or contractor may count toward its MWDBE goals a portion of the total dollar value of the contract that the MWDBE partner's participation in the joint-venture represents. Credit will be given equal to the minority partner's percentage of ownership in the joint venture. A MWDBE joint-venture partner must be responsible for a clearly defined portion of the work to be performed in addition to satisfying requirements for ownership and control.

5. A recipient or contractor may count toward its MWDBE goals only expenditures to MWDBEs whose ownership interests are real and continuing and not created solely to meet PWC's goals for participation, and that perform a commercially useful function in the work of a contract. A MWDBE is considered to perform a commercially useful function when it is responsible for execution of a distinct element of the work of a contract and carries out its responsibilities by actually performing, managing, and supervising the work involved. To determine whether a MWDBE is performing a commercially useful function, the MWDBE Program staff shall evaluate the amount of work subcontracted, industry practices, and other relevant factors. Consistent with normal industry practices, an MWDBE may enter into subcontracts. If a MWDBE contractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of normal industry practices, the MWDBE shall be presumed not to be performing a commercially useful function. Evidence to rebut this presumption may be presented to the MWDBE Program staff. The MWDBE may present evidence to rebut this presumption. The MWDBE Program staff decision on the rebuttal of this presumption is subject to review by PWC General Manager/CEO or its designee. Once a contractor is determined to be an eligible MWDBE in accordance with this section, the total dollar value of the contract awarded to MWDBE is counted toward the applicable MWDBE goals, except as provided in

the provisions of this section.

6. A contractor may count toward its MWDBE goals expenditures for materials and supplies obtained from MWDBE suppliers and manufacturers, provided that the MWDBE assumes the actual and contractual responsibility for the provision of the materials and supplies.

H. Documentation of Attainment of MWDBE Participation Requirements

In order that PWC General Manager/CEO or its designee may make a recommendation to PWC as to the responsiveness of bidders, bidders shall be required to submit the following information on each MWDBE-related subcontract:

1. A description of the subcontract and purchase(s) of significant equipment and supplies to be used to perform the subcontract or prime contract, including the name and address of each MWDBE firm selected, and the name and telephone number of a contact person;

2. The dollar amount of participation of each MWDBE;

3. A statement of intent from the MWDBE subcontractor or material supplier as;

    a. Identified in Section IV, H(1) above that they intend to contract or supply the materials, or

    b. Sworn statements, with appropriate documentation, showing that the contractor made a good-faith effort to comply with the MWDBE Program in accordance with Section IV, E of this Program.

V. PROCEDURES FOR ARCHITECTURE & ENGINEERING (A&E) CONTRACTS

A. Purpose and Application

1. The general purpose (goal) of this Program is to help develop and support MWDBEs by providing opportunities for participation in the performance of PWC's A&E contracts financed entirely with PWC funds.

2. This Program applies to all A&E contracts except contracts in those unique circumstances where written exemption of particular contracts is determined as an exception, and less than fifty thousand dollars ($50,000.00) by PWC General Manager/CEO. PWC General Manager/CEO or its designee will be responsible for administering and monitoring the Program to ensure that appropriate action(s) are taken in efforts of achieving the goals.

3. Where contracts are funded in whole or in part with federal or state funds and the grants, loans, or other funding sources containing MWDBE Program requirements, PWC General Manager/CEO or its designee will be responsible for monitoring the Program to ensure the goals are met.

4. Since PWC Request for Qualifications (RFQ) are prepared by the Engineering and Facilities Departments, each of these departments shall prepare such documents with Procurement pre-approved templates for the qualification-based selection process, which includes the Program goals as required to implement this Program.

B. MWDBE Aspirational Goals

1. To implement this Program, the goal shall be to award six percent (6%) of the total A&E contract dollars awarded in each fiscal year to MBE firms and five percent (5%) to WBE firms. The goals will become effective on the date that PWC approves the Program and continue for a period of five (5) years.

C. Request for Qualifications

1. It is not required that contracts under $50,000 meet the contract goal. When possible, at least twenty-five (25) percent of the firms notified of the contract opportunity shall be MWDBE. A list of available firms will be provided by the MWDBE Program staff to the Procurement Advisor and Department. The MWDBE Program staff shall track and report the firms that are notified and that provide submittals.

D. PWC Responsibilities

1. **Identification of MWDBE Firms**

    a. The MWDBE Program staff will establish and maintain a directory of certified Minority, Women, and Disadvantaged Business Enterprises. The purpose of the directory is to provide a resource on PWC A&E projects. The directory will not constitute a recommendation or endorsement of any listed firm. The directory will be developed and maintained by the MWDBE Program Staff.

    b. The directory will include:

        i. Business name, address, telephone number, and email address;
        ii. Name(s) of business owner(s);
        iii. Type of license;
        iv. NAICS;
        v. Type of MWDBE certification, and;
        vi. Certification and expiration date with an acceptable agency.

    c. PWC shall advertise on a contract-by-contract basis throughout the year as deemed necessary for MWDBE outreach. Advertisements shall be placed with minority/women-focused publications (state and local). Notification will also be sent to community organizations which might have knowledge of MWDBE firms.

d. The department heads and MWDBE Program staff should attend local and regional business fairs to promote the MWDBE Program. The departments shall also identify potentially eligible firms through affirmative action efforts and the normal course of business. The names of identified firms shall be forwarded to the MWDBE Program staff.

E. Meeting MWDBE Aspirational Goals

1. Goals must be met by awarding contracts to certified MWDBE firms. The MWDBE must be certified at the time of the contract award. MWDBE firms not certified at the time of the contract award will not be counted towards MWDBE goals. MWDBE goals may be met by a certified joint venture or partnership. In the case of joint ventures or partnerships, MWDBE participation counted toward the goal will be equal to the percentage of the total dollar value of the contract that the MWDBE partner is responsible for performing.

F. Counting MWDBE Participation

1. The total dollar value of a contract with a disadvantaged business owned and controlled by a minority woman is counted toward either the minority goal or the goal for women, but not toward both. The contractor or MWDBE Program staff may choose the goal to which the value is applied.

2. If a determination is made by the MWDBE Program staff that the goals have not been met, the prime service provider will be required to submit a good-faith effort statement prior to PWC awarding the contract.

G. Provider Good-Faith Efforts

The following is a list of the efforts that should be made by the prime A&E firm to encourage MWDBE participation. In order to receive credit for having made "good faith efforts", the prime A&E firm should document all actions taken to include the following:

1. Attending pre-bid meetings scheduled by the department;

2. Identifying selected specific items of the project which could be executed by a MWDBE;

3. Soliciting MWDBE A&E firm participation in a reasonable time before the solicitations are due through advertisements in circulation media, trade publications, and minority-focused media;

4. Contacting local firms, firms owned by minorities or women, and associations or business development centers which disseminate information to local businesses and businesses owned by minorities or women in a timely manner to allow sufficient time for MWDBEs to respond;

5. Following up on initial solicitations of interest by contacting the MWDBE to determine whether the MWDBE was interested in performing specific items of the

project;

6. Attempting to enter into joint venture or partnership arrangements with MWDBEs and provide interested MWDBEs with information about the requirements for the project;

7. Providing assistance to MWDBEs in the review of qualification submittal and work to be done by sub-A&E firms;

8. Using available directories of certified MWDBEs and other available resources;

9. Ensuring that the firm negotiated in good faith with the MWDBE and did not unjustifiably reject as unsatisfactory qualifications prepared by any Minority, Women, or Disadvantaged Business Enterprise;

10. Making every effort to obtain Minority, Women, or Disadvantaged Business Enterprise participation that could reasonably be expected to produce a level of participation sufficient to meet the goals of PWC; and

11. Providing interested minority, women, and disadvantaged businesses with information relative to project requirements.

H. Documenting Good-Faith Efforts

If the prime A&E firm does not meet the goals for MWDBE participation at the time of qualification submittal, then the following documents indicating "good-faith efforts" should be submitted as a minimum:

1. A report of all proposals received by the prime service provider from MWDBE sub-A&E firms must indicate the action taken by the prime A&E firm in response to the qualification submittal. In cases where proposals have been rejected, the reason for rejection must be indicated.

2. Documentation of efforts to enter into agreements with MWDBEs for sub-A&E work or arrangements for joint ventures, partnerships, or other multi-entity relationships. Also included should be a statement of why agreements or arrangements were not made.

3. Proof of contact with MWDBEs and associations or business development centers that disseminate information to MWDBEs.

4. A copy of emails or notices sent to groups in Section VI, J(3) above notifying them of the firm’s intent to submit a qualification submittal to PWC. The emails or notices should indicate the areas of work available for sub-A&E firms.

5. Description of assistance provided to MWDBEs in review of the qualification submittal and work to be done by sub-A&E firms.

6. Description of the use made by firms of available resources such as directories of MWDBEs.

7. Documentation of advertisements sent to general circulation media, trade publications, and minority-focused media.

8. Proof of attendance at any pre-bid meeting.

If the prime A&E firm fails to meet the MWDBE goals with its proposed project team and cannot provide documentation of "good-faith efforts", these failures will be noted to the involved department by the MWDBE Program Staff, and the firm may be disqualified.

VI. PROCEDURES FOR PURCHASE CONTRACTS

A. Purpose and Application

1. The general purpose of this Program is to help develop and support Minority, Women, and Disadvantaged Business Enterprises (MBE, WBE, and DBE) by providing opportunities for participation in purchase contracts financed entirely with PWC funds.

2. This Program shall apply to purchase contracts over $30,000 for apparatus, materials, supplies and purchase contracts for goods where the patent-holder is not the sole supplier. PWC General Manager/CEO or its designee will be responsible for monitoring the Program to ensure the goals are met.

3. Where contracts are funded in whole or in part with federal or state funds and the grants, loans, or other funding sources containing MWDBE Program requirements, PWC General Manager/CEO or its designee will be responsible for monitoring the Program to ensure the goals are met.

4. Since PWC purchase contracts are prepared by various departments, each of these departments shall prepare such documents with Procurement pre-approved templates for the quote or bid process, which includes the goals as required to implement this Program. PWC Departments shall document and provide to the MWDBE Program staff a list of all providers notified and responses received for informal purchases.

B. MWDBE Aspirational Goals

1. To implement the purpose of this Program, the goal shall be to award at least four (4) percent of the total of all purchase contract award amounts in each fiscal year to MBEs and at least four (4) percent to WBE firms. It is further the intent of PWC to encourage, to the extent allowed the use of local vendors (defined as located within Cumberland, Hoke, or Harnett County) whenever doing so is consistent with the requirements under G.S. 143-129.

C. Request for Quotes or Invitation for Bids

1. The various departments soliciting goods will be responsible for contacting from the directory at least one MBE and one WBE for a price quotation of $30,000 or more on each purchase contract with MWDBE availability.

2. A list of available MWDBEs will be provided by the MWDBE Program staff to the Procurement Advisor and Department. The MWDBE Program staff shall track and report the MWBDEs that are notified and that provide submittals.

D. PWC Responsibilities

1. Identification of MWDBEs

a. The MWDBE Program staff will establish and maintain a directory of certified Minority, Women, and Disadvantaged Business Enterprises. The purpose of the directory is to provide a resource for on PWC purchase contracts. The directory will not constitute a recommendation or endorsement of any listed supplier. The directory will be developed and maintained by the MWDBE Program Staff.

b. The directory will include:

i. Business name, address, telephone number, and email address;
ii. Name(s) of business owner(s);
iii. NAICS;
iv. Type of MWDBE certification, and;
v. Certification and expiration date with an acceptable agency.

c. PWC shall advertise on a contract-by-contract basis throughout the year as deemed necessary for MWDBE outreach. Advertisements shall be placed with minority/women-focused publications (state and local). Notification will also be sent to community organizations which might have knowledge of MWDBE suppliers.

d. The department heads and MWDBE Program staff should attend local and regional business fairs to promote the MWDBE Program. The departments shall also identify potentially eligible suppliers through affirmative action efforts and the normal course of business. The names of identified suppliers shall be forwarded to the MWDBE Program staff.

2. **MWDBE Eligibility Standards –** The eligibility of a business is determined by the ownership and control of the business.

a. An eligible Minority Business Enterprise owner is a citizen or lawful permanent resident of the United States, a member of a recognized ethnic or racial group, and fifty-one (51) percent owner of the business.

b. The eligible ethnic or racial groups are:

i. Black/African American
ii. Hispanic American
iii. Asian American
iv. Native American

c. An eligible Women Business Enterprise owner is a citizen or lawful resident of the United States and a fifty-one (51) percent owner of the business and is female.

3. **Removal of MWDBE Procedures -** A supplier certified as a MWDBE may be removed from the program directory for, but not limited to, any of the following reasons:

    a. **Change of Status** - PWC General Manager/CEO or its designee may remove a MWDBE if he/she finds that the ownership or control of the business changes so that the business no longer meets the requirements of Section IV, D(2) (b) and (c) above.

    b. **Failure to comply with the MWDBE Program** - The certification of a business as a MWDBE may be removed by PWC General Manager/CEO or its designee if he/she finds any of the following conditions:

        i. That a business has submitted inaccurate, false or incomplete information to PWC;
        ii. That in performance of a contract, a business has failed to comply with requirements of the contract with PWC;
        iii. That in performance of a contract, a business has failed to comply with MWDBE requirements of a contract established by a contractor with PWC in response to PWC requirements; or
        iv. That a business has otherwise failed to comply with the provisions of this MWDBE Program.

    c. **Appeal of Removal -** A business may appeal a determination of a MWDBE by satisfying the eligibility requirements in Section IV, D (2) (b) and (c).

    d. **Pre-bid Meeting or Site Visit -** PWC may hold a pre-bid meeting on formal and informal bid contracts for all prospective bidders, subcontractors, and MWDBEs for the purpose of explaining the provisions of the MWDBE Program, the process for bidding, and the contract to be performed. Available data on MWDBEs interested and/or capable of engaging in the prospective contract shall be made available to prospective bidders, contractors, and subcontractors.

E. Award of Purchase Contracts

1. If a purchase contract is to be awarded, it shall be awarded in accordance with North Carolina General Statutes and/or other applicable PWC, Commission, and State regulations.

VII. PROCEDURES FOR PROFESSIONAL, GENERAL (OTHER) SERVICE CONTRACTS

A. Purpose and Application

1. The general purpose (goal) of this Program is to help develop and support MWDBEs by providing opportunities for participation in the performance of PWC's professional service contracts and general (other) service contracts (hereinafter referred to as service contracts).

2. This Program applies to all service contracts except contracts under $30,000, and in those unique circumstances where PWC General Manager/CEO or its designee determines that an exception is necessary.

3. Where contracts are funded in whole or in part with federal or state funds and the grants, loans, or other funding sources containing MWDBE Program requirements, PWC General Manager/CEO or its designee will be responsible for monitoring the Program to ensure the goals are met.

4. PWC General Manager/CEO or its designee will be responsible for administering and monitoring the Program to ensure that appropriate action(s) are taken in efforts of achieving the goals.

B. MWDBE Aspirational Goals

1. To implement this Program, the goal shall be to award nine percent (9%) of the total service contract dollars awarded in each fiscal year to MBE firms and four percent (4%) to WBE firms. The goals will become effective on the date that PWC approves the Program and continue for a period of five (5) years.

C. PWC's Responsibilities

1. Identification of MWDBE Firms

a. The MWDBE Program staff shall establish and maintain a directory of certified MWDBE service providers that shall be made available to all departments to assist them in identifying appropriate MWDBE service providers that can be used to meet PWC's MWDBE goals. The directory shall include the businesses which provide the services routinely procured by PWC and the NAICS which the businesses are capable of providing. The directory will not constitute a recommendation or endorsement of any listed business. The directory will include:

   i. Business name, address, and telephone number;
   ii. Name(s) of business owner(s);
   iii. NAICS of services available;
   iv. Type of MWDBE certification, and;
   v. Certification and expiration date with an acceptable agency.

b. PWC shall provide a list of opportunities at least 30 days prior to each fiscal year (July) for MWDBE service providers. Advertisements shall

be placed with minority/women-focused publications (state and local). Notification will also be sent to community organizations that might have knowledge of MWDBE firms. Interested MWDBEs shall provide a letter of interest within **14 calendar days** of the advertisement.

c. For opportunities that arise throughout the fiscal year, PWC shall provide an Advertisement for opportunity to but not limited to MWDBE service providers within the MWDBE directory and identified MWDBEs from the Disparity Study. Advertisements shall be placed with minority/women-focused publications (state and local). Notification will also be sent to community organizations that might have knowledge of MWDBE firms. Interested MWDBEs shall provide a letter of interest within **7 calendar days.**

d. The department heads and MWDBE Program staff should attend local and regional business fairs to promote the MWDBE Program. The departments shall also identify potentially eligible service providers through affirmative action efforts and the normal course of business. The names of identified businesses shall be forwarded to the MWDBE Program staff.

D. Request for Proposals

1. MWDBE contract goals shall be set for service contracts over $30,000.00. The request for proposals shall state the contract goals of four (4) percent for both MWDBE Professional and General Service contractors.

2. Contracts under $30,000 and contracts without letters of interest are not required to meet the contract goal.

3. A list of available service providers will be provided by the MWDBE Program staff to the Procurement Advisor(s) and department(s). The MWDBE Program staff shall track and report the service providers that are notified and that provide proposals.

E. Meeting MWDBE Aspirational Goals

1. Goals must be met by awarding contracts to certified MWDBE service providers. The MWDBE must be certified at the time of the contract award. MWDBE service providers not certified at the time of the contract award will not be counted towards MWDBE goals. MWDBE goals may be met by a certified joint venture or partnership. In the case of joint ventures or partnerships, MWDBE participation counted toward the goal will be equal to the percentage of the total dollar value of the contract that the MWDBE partner is responsible for performing.

F. Counting MWDBE Participation

1. The total dollar value of a contract with a disadvantaged business owned and controlled by a minority woman is counted toward either the minority goal or the goal for women, but not toward both. The contractor or MWDBE Program staff

may choose the goal to which the value is applied.

2. If a determination is made by the MWDBE Program staff that the goals have not been met, the prime service provider will be required to submit a good-faith effort statement prior to PWC awarding the contract.

G. Provider Good-Faith Efforts

The following is a list of the efforts that should be made by the prime service provider to encourage MWDBE participation. In order to receive credit for having made "good faith efforts", the prime service provider should document all actions taken to include the following:

1. Attending pre-bid meetings scheduled by the department;

2. Identifying selected specific items of the project which could be executed by a MWDBE;

3. Soliciting MWDBE service provider participation in a reasonable time before the proposals are due through advertisements in circulation media, trade publications, and minority-focused media;

4. Contacting local firms, firms owned by minorities or women, and associations or business development centers which disseminate information to local businesses and businesses owned by minorities or women in a timely manner to allow sufficient time for MWDBEs to respond;

5. Following up on initial solicitations of interest by contacting the MWDBE to determine whether the MWDBE was interested in performing specific items of the project;

6. Attempting to enter into joint venture or partnership arrangements with MWDBEs and provide interested MWDBEs with information about the requirements for the project;

7. Providing assistance to MWDBEs in the review of proposals and work to be done by sub-service providers;

8. Using available directories of certified MWDBEs and other available resources;

9. Ensuring that the proposer negotiated in good faith with the MWDBE and did not unjustifiably reject as unsatisfactory quotes prepared by any Minority, Women, or Disadvantaged Business Enterprise;

10. Making every effort to obtain Minority, Women, or Disadvantaged Business Enterprise participation that could reasonably be expected to produce a level of participation sufficient to meet the goals of PWC; and

11. Providing interested minority, women, and disadvantaged businesses with information relative to project requirements.

I. Documenting Good-Faith Efforts

If the prime service provider does not meet the goals for MWDBE participation at the time the proposals are due, then the following documents indicating "good-faith efforts" should be submitted as a minimum:

1. A report of all proposals received by the prime service provider from MWDBE sub-providers must indicate the action taken by the prime service provider in response to the proposal. In cases where proposals have been rejected, the reason for rejection must be indicated.

2. Documentation of efforts to enter into agreements with MWDBEs for sub-provider work or arrangements for joint ventures, partnerships, or other multi-entity relationships. Also included should be a statement of why agreements or arrangements were not made.

3. Proof of contact with MWDBEs and associations or business development centers that disseminate information to MWDBEs.

4. A copy of emails or notices sent to groups in Section VI, J(3) above notifying them of the firm's intent to submit a qualification submittal to PWC. The emails or notices should indicate the areas of work available for sub-providers.

5. Description of assistance provided to MWDBEs in review of the qualification submittal and work to be done by the sub-provider.

6. Description on use made by firms of available resources such as directories of MWDBEs.

7. Documentation of advertisements sent to general circulation media, trade publications, and minority-focused media.

8. Proof of attendance at any pre-bid meeting.

If the prime service provider fails to meet the MWDBE goals with its proposed project team and cannot provide documentation of "good-faith efforts", these failures will be noted to the involved department by the MWDBE Program Staff, and the service provider may be disqualified.

VIII. UTILIZATION OF JOINT VENTURE

PWC is committed to promoting the utilization of joint venturing amongst business enterprises and to support, encourage, and offer procurement opportunities to support utilization when available so that business enterprises can meet capacity development.

The purpose of Joint Venturing is to connect high potential MWDBEs with a Prime Contractor that will supplement their growth and development. Joint Venturing is seen as an important approach to help MWDBEs compete for larger contracts. PWC conducts many outreach events to connect certified MWDBEs with PWC decision makers and prime contractors. PWC shall provide targeted outreach, training, and technical support

to MWDBEs and urge Prime contractors to provide an equivalent level of outreach and support when joint venturing is available. PWC's mission is to provide an innovative program to the industry that focuses on the accelerated growth of diverse partnerships.

IX. MWDBE REPORTING PROCEDURE

1. The MWDBE Program staff shall submit quarterly progress reports to PWC Departments. The quarterly progress reports shall be prepared by the MWDBE Program staff from information (i.e. pay applications, MWDBE forms, and requisition checklist form) submitted by each department involved in procurement within thirty (30) days following the period (each quarter). Progress reports shall indicate the type of procurement contract (i.e., construction, A&E, purchase, professional services, or general services) and shall include the following:

    vi. Number and dollar value of total procurement contracts;
    vii. Number and dollar value of all procurement contracts awarded to MWDBEs by the department;
    viii. Where goals are not met, the progress report shall specify the reasons and include recommendations for increasing participation.

2. PWC General Manager/CEO or its designee shall submit an annual report to Commission. The report shall include the total number of procurement contracts by departments and the dollar value of all contracts with MWDBE participation. The level of MWDBE participation shall be reported annually.

FAYETTEVILLE PUBLIC WORKS COMMISSION'S

MWDBE COMPLIANCE PROVISIONS

APPLICATION:

The requirements of Fayetteville Public Works Commission (PWC) Minority, Women, and Disadvantaged Business Enterprise (MWDBE) Program for participation specific contracts are hereby made part of the Contract Documents. Copies of the Program may be obtained from:

Fayetteville Public Works Commission
Economic Inclusion Programs
P.O. Box 1089
Fayetteville, North Carolina 28302
Phone (910) 223-4016 Fax (910) 483-1429
E-mail: EIProgram@faypwc.com

NCDOT DBE Directory: www.ebs.nc.gov/VendorDirectory
HUB Directory: https://ncadmin.nc.gov/businesses/hub

MWDBE Compliance Requirements:

1. The Bidder shall provide, with their Bid Form, at the time bids are due, the documents set forth below, properly executed. Returning executed copies indicates and establishes that the Bidder understands and agrees to any incorporated MWDBE contract provisions.

2. All Bidders must provide with their Bid Form, at the time bids are due, a properly completed and executed copy of **either:**

   - Affidavit A – Listing of Good-Faith Efforts **OR**
   - *Affidavit B – Intent to Self-Perform with Own Workforce.

   *Affidavit B should **only** be used if the Contractor will perform **ALL Elements** of the Work on this project with their own forces **AND** will complete **ALL Elements** of this project **WITHOUT** the use of subcontractors, material suppliers, or providers of professional services.

3. Upon being identified as the apparent lowest responsive, responsible Bidder, a Bidder shall, within twenty-four (24) hours of PWC's notification provide a properly completed and executed copy of **either:**

   - Affidavit C – Percentage of MWDBE Participation **OR**
   - Affidavit D – Good-Faith Efforts.

4. All Bidders must provide with their Bid Form, at the time bids are due, a properly completed and executed copy of Affidavit E- Identification of MWDBE/Local Participation Form

ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

All written statements, certifications, or intentions made by the Bidder shall become a part of the agreement between the Contractor and Fayetteville Public Works Commission for performance of this contract.

SUBCONTRACTOR PAYMENT REQUIREMENTS:

North Carolina General Statutes 143-134.1 (N.C.G.S.) states that the percentage of retainage on payments made by the prime contractor to the subcontractor shall not exceed the percentage of retainage on payments made by the Fayetteville Public Works Commission to the prime contractor. Failure to comply with this provision shall be considered a breach of the contract, and the contract may be terminated in accordance with the termination provisions of the contract.

The Contractor shall provide an itemized statement of payments to each MWDBE subcontractor before final payment is processed.

The Contractor shall provide an itemized statement of payments to each NON-MWDBE subcontractor before final payment is processed.

_____
Contractor

_____
Signature

_____, _____
Printed Name Title

_____
Date

ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

Affidavit A: Listing of the Good Faith Efforts

Affidavit of _____
(Name of Bidder)

I have made a good faith effort to comply under the following areas checked:

Total Available GFE Points: ***155***		*Minimum Number GFE Points* ***Required*****:** ***50***
Points		
	10	Contacting minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor or available on State or local government-maintained lists at least 10 days before the bid or proposal date and notifying them of the nature and scope of the work to be performed.
	10	Making the construction plans, specifications and requirements available for review by prospective minority businesses or providing these documents to them at least 10 days before the bid or proposals are due.
	15	Breaking down or combining elements of work into economically feasible units to facilitate minority participation.
	10	Working with minority trade, community, or contractor organizations identified by the Office for Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
	10	Attending any pre-bid meetings scheduled by the public owner.
	20	Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.
	15	Negotiating in good faith with interested minority businesses and not rejecting them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
	25	Providing assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisting minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
	20	Negotiating joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
	20	Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.
Total GFE Points (Claimed by Bidder):		***Total GFE Points (Assessed by PWC):***

In accordance with NCGS 143-128.2(d) the undersigned will enter into a formal agreement with the firms listed in the Identification of Small Disadvantaged Business Participation schedule conditional upon execution of a contract with the Owner. Failure to abide by any applicable statutory provision may constitute a breach of the contract. The undersigned hereby certifies that he or she has read the terms of the MWDBE business commitment and is authorized to bind the Bidder to the commitment herein set forth.

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

Affidavit B: Intent to Perform Contract with Own Workforce

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for contract:

_____
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform **all elements of the work** on this project with his/her own current workforces; and will complete all elements of this project **without** the use of subcontractors, material suppliers, or providers of professional services.

The Bidder agrees to provide any additional information or documentation requested by the Owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

Affidavit C: Percentage of MWDBE Participation

Affidavit of _____
(Name of Bidder)

I hereby certify that on contract: _____
(Name of Project)

$_____
(Dollar Amount of Total Bid)

I will expend a minimum of _____% of the total dollar amount of the contract with Minority, Women, and Disadvantaged Business Enterprises (MWDBE). MWDBEs will be employed as subcontractors, vendors, or providers of professional services. Such work will be subcontracted to the following firms listed below.

Name, Address, & Phone No.	*MWDBE Category	NAICS	Dollar Value	% of Contract

*MWDBE categories: Black-African Americans (B), Hispanic-Americans (H), Asian- Americans (A), Native-Americans (I), Women (F), Socially/Economically Disadvantaged (D)

ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

Pursuant to NCGS 143-128.2(d), the undersigned will enter into a formal agreement with MWDBEs for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the Bidder to the commitment herein set forth.

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

Affidavit D: Good Faith Efforts

If Owner determines using reasonable discretion that Affidavit C is insufficient, Bidder agrees to provide the following information regarding any good-faith efforts.

Name, Address, & Phone No.	*MWDBE Category	NAICS	Dollar Value

*MWDBE categories: Black-African Americans (B), Hispanic-Americans (H), Asian- Americans (A), Native-Americans (I), Women (F), Socially/Economically Disadvantaged (D)

Bidder may be requested to provide documentation of the Bidder's good-faith efforts. Examples of documentation may include the following:

a. Copies of solicitations for quotes to MWDBEs. Each solicitation may include a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
b. Copies of quotes or responses received from each firm responding to the solicitation.
c. A telephone log of follow-up calls to each firm sent a solicitation.
d. For subcontracts where a MWDBE is not considered the lowest responsible sub- bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
e. Documentation of any contacts or correspondence to MWDBE, community or contractor organizations in an attempt to meet the goal.
f. Copy of pre-bid roster.
g. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for MWDBEs.
h. Letter detailing reasons for rejection of a MWDBE due to lack of qualification.
i. Letter documenting proposed assistance offered to MWDBEs in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive Bidder.

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

Affidavit E: Identification of MWDBE/Local Participation

_____
(Name of Bidder)

I hereby certify that on contract: _____
(Name of Project)

We will use the following Minority, Women, and Disadvantaged Business Enterprises (MWDBE), and Local (Cumberland, Hoke, Harnett County) as construction subcontractors, vendors, suppliers, or providers of professional services.

Name, Address, & Phone No.	*MWDBE Category / **Local	NAICS	Dollar Value

*MWDBE categories: Black-African Americans (B), Hispanic-Americans (H), Asian- Americans (A), Native-Americans (I), Women (F), Socially/Economically Disadvantaged (D)

**Local: Fayetteville Metropolitan Statistical Area (MSA) comprising of Cumberland County, Hoke County, and Harnett County. PWC is requesting this information for reporting purposes only, and use of local entities will not be considered for compliance with the requirements of the MWDBE Program.

The total value of MWDBE/local business contracting will be $_____

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

FAYETTEVILLE PUBLIC WORKS COMMISSION
MWDBE ADD / CHANGE FORM

If a MWDBE subcontractor fails to complete work under the subcontract for any reason, the recipient must require the prime contractor to employ the good faith efforts set forth in the MWDBE Program if soliciting a replacement or additional subcontractor.

For MWDBE Change Request, please provide all information below:

Prime Contractor: _____

Subcontracted Work: _____

Previous Subcontractor: _____

Reason this for change request:

_____

New Subcontractor: _____MWDBE Category: _____

To Add MWDBE Subcontractor/Subcontracted work:

If this is a new trade being subcontracted or a subcontractor that was not documented in the original Project Bid Information submittal, then good faith efforts to solicit a MWDBE must be documented, as the original MWDBE instructions indicate. Please provide all good faith efforts below showing all the MWDBE firms contacted to perform this work along with any additional good faith efforts or evidence that there are not reasonably available firms in the work area. PWC's MWDBE Program requires that good faith efforts are to be carried out to the fullest extent practicable. If solicitations were not carried out due to being impracticable, please attach this explanation to this form.

Name, Address, & Contact Information	MBE or WBE and Certifying agency	How was this firm contacted (email, letter, or Phone) and what was the result of the solicitation? *

*Must submit copies of emails or letters. If phone calls were made this sheet can serve as documentation of calls

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

SMALL LOCAL SUPPLIER / MWDBE SUBCONTRACTOR DISCLOSURE FORM

Contractor: _____
Address & Phone: _____
Project: _____
Name: _____
Pay Application # _____

Please complete the below form by providing the necessary information for the payments made to each subcontractor, vendor, or supplier for the work associated with the identified pay application. This form must be fully completed and attached to each pay application.

Firm Name, Address, and Contact Information	Payment Amount	Type of Work/Commodity (Include NAICS Code)

_____
Signature

_____, _____
Printed Name Title

_____
Date

SECTION B - CONTRACT EXECUTION DOCUMENTS

*** THIS PAGE WAS INTENTIONALLY LEFT BLANK ***

NOTICE OF AWARD

TO: _____
_____
_____

PROJECT DESCRIPTION: **P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT**

The OWNER has considered the BID submitted by you for the above described work in response to its Advertisement for Bids dated _____ and Instructions to Bidders.

You are hereby notified that your BID has been accepted for items in the amount of $_____.

You are required by the Instructions to Bidders to execute the Agreement and furnish the required Performance Bond, Payment Bond, and Certificates of Insurance within ten (10) calendar days from the date of this NOTICE to you.

If you fail to execute said Agreement and to furnish said Bonds within ten (10) days from the date of this Notice, said Owner will be entitled to consider all your rights arising out of the OWNER's acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____day of _____, 2024.

OWNER: **FAYETTEVILLE PUBLIC WORKS COMMISSION**
FAYETTEVILLE, NC

BY: Victoria McAllister
TITLE: Purchasing Manager

ACCEPTANCE OF AWARD

P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT

Receipt of the preceding NOTICE OF AWARD is hereby acknowledged this the _____ day of _____, 2024.

(CONTRACTOR)

By:_____

Title:_____

- END OF SECTION -

State of North Carolina
Cumberland County

CONSTRUCTION AGREEMENT

THIS CONSTRUCTION AGREEMENT ("Agreement" or "Contract") is made by and between the Fayetteville Public Works Commission ("PWC"), a North Carolina public authority, and _____ [PER THE CHARTER (SEE SEC 6A.20), THE CONSTRUCTION CONTRACT, IF MORE THAN $500K, MUST BE BETWEEN THE CITY (BY AND THROUGH PWC) AND THE CONTRACTOR], ("Contractor"), a _____ registered to do business in North Carolina (each of PWC and Contractor is a "Party" and both are collectively the "Parties") as of the date of execution last written below (the "Effective Date"). The Parties agree as follows:

1. The Construction Project. Contractor shall furnish and bear solely the entire cost of all labor and materials necessary for the construction and/or renovation of the Project (defined hereinbelow) as specified in the Contract Documents (defined hereinbelow) and complete all Work on the Project in a Workmanlike manner in strict accordance with the Contract Documents, schedule delivery of the new materials, furnish and bear solely the entire cost of all supervision, contract administration, equipment, tools, and other means necessary to complete the Project, perform every obligation imposed by the Contract Documents, and be solely responsible for the clean-up and disposal of all materials and debris relating to or arising from the construction and renovation, subject to any exceptions that are specifically set forth in the Contract Documents. Except as otherwise specifically provided in the Contract Documents, Contractor is solely responsible for all construction means, methods, techniques, sequences, procedures, safety precautions or programs, supervising, coordinating, and performing all the Work necessary to complete the Project; provided, however, PWC shall have the right, without incurring any liability to the Contractor, to suspend Contractor's performance when a PWC employee, in his or her opinion, observes a safety violation involving a threat to life or imminent danger of bodily injury, and the suspension shall remain in effect until Contractor remedies the safety violation.

2. Terms. Capitalized terms used in this Agreement have the meaning specified below:

"Business Day" means each calendar day that is not a Saturday, Sunday, holiday observed by the federal government for its employees, or holiday observed by the State of North Carolina for its employees.

"Completion of the Project" means: (i) the Project is completed in accordance with this Agreement, except for punch list items; (ii) PWC has received any required temporary or final certificate of occupancy from the governmental agency with jurisdiction over the Project; and (iii) the registered architects or engineers (the "Designer(s)") who designed portions or components of the Project have issued certificates of Completion of the Project as to those portions or components.

"Contract Documents" means the following documents that were either made available to Contractor by PWC during the bid solicitation process (including Drawings) or executed by the Parties or both, which are all incorporated by reference herein:

a. This Agreement
b. General Conditions
c. Bid Submittal Documents
d. Contractor's Submitted Bid
e. Bid Bond
f. [Form of Exceptions]
g. Notice of Award
h. Acceptance of Award
i. Performance Bond
j. Payment Bond
k. Copy of General Contractor's License
l. Power of Attorney
m. Certificate of Insurance
n. Section C – Administrative Provisions
o. Section D - Technical Specifications
p. [Additional Specifications]
q. [Appendices]

The following documents may be delivered or issued on or after the Effective Date of the Agreement and may not be attached to this Agreement, but are considered Contract Documents when executed by the Parties:

r. Notice to Proceed and Acceptance of Notice
s. Work Change Directive(s)
t. Change Order(s)
u. Field Order(s)

There are no Contract Documents other than those identified in this Agreement. The Contract Documents may only be amended, modified, or supplemented as provided in this Agreement in a writing signed by the Parties.

"Fault" means a breach of contract by Contractor, negligent, reckless, or intentional act(s) or omission(s) constituting a tort under applicable statutes or common law by one or more Responsible Persons, or violation(s) of applicable statute(s) or regulation(s) by a Responsible Person.

"Project" means _____ _____, as more specifically set forth in the Contract Documents.

"Responsible Person" means the Contractor and each of its employees, agents, representatives, subcontractors, or other persons and entities for which Contractor may be liable or responsible as a result of any statutory, tort, or contractual duty.

The terms used in this Agreement shall have the meaning as stated herein and in the General Conditions. In the event of a conflict between the terms of this Agreement and any other component(s) of the Contract Documents, the terms of this Agreement shall govern.

3. Contract Price. PWC shall pay Contractor for Completion of the Project in accordance with the Contract Documents the amount identified in the accepted Bid Form of

Contractor, being in the total amount of $_____ (the "Price"). Contractor understands and acknowledges that the Price is derived from a specific appropriation of funds provided for the Project. Contractor agrees and acknowledges the Price is equal to the aggregate cost of all Work to be done on the Project, including all labor, materials, equipment, apparatus, and supplies, set in accordance with the amount specified on the Bid Form submitted by Contractor and accepted by PWC.

4. Contract Times. The Parties shall perform their obligations under this Agreement in compliance with all scheduling deadlines set forth in the Contract Documents. The Contractor shall commence the Work to be performed under this Agreement on a date to be specified in accordance with the Notice to Proceed issued by PWC. Contractor shall achieve Completion of the Project no later than 360 consecutive calendar days from said date plus any modifications thereof allowed in accordance with the Contract Documents (the "Completion Date").

5. Payment. PWC shall pay Contractor in installment payments plus a final payment, as set forth in the Contract Documents. For each applicable installment payment, Contractor shall submit an application for payment in accordance with the Contract Documents. An application for payment will be processed by PWC as provided in the Contract Documents. Such installment payments shall reflect the actual Cost of the Work, not to exceed in total the Price, and the allocable portion of the total Price for said installment. PWC shall make payment to the Contractor, less any applicable retainage set forth in the Contract Documents; provided, however, that PWC may withhold all or a portion of a payment on account of (1) incomplete Work, (2) defective or nonconforming Work, (3) claims filed or a reasonable basis to believe that such claims will be filed imminently, (4) failure of the Contractor to make payments properly for labor, services, materials, equipment or subcontracts, (5) damages caused to PWC or another party by one or more Responsible Persons, or (6) failure to comply with the terms and conditions of this Agreement. In the final payment, PWC shall pay the balance of the Price, including all retained amounts, less any Liquidated Damages and other applicable damage and claim amounts, to Contractor within forty-five (45) days of Completion of the Project; provided, however, that PWC may withhold a reasonable sum from the final payment to ensure correction of any final items or condition on the Project.

6. Retainage. Subject to any restrictions applicable to any federal grant funds that may be utilized for the Project, PWC may, in its discretion, retain up to five percent (5%) of any periodic payment due Contractor; provided, however, when the Project is fifty percent (50%) complete, PWC, with written consent of the surety, shall not retain any further retainage from periodic payments due Contractor if Contractor continues to perform satisfactorily and any nonconforming Work identified in writing prior to that time by PWC or the Designer has been corrected by Contractor and accepted by PWC or the Designer, and provided further that full payment, less authorized deductions, shall also be made for those line item trades that have reached one hundred percent (100%) completion of their contract obligations by or before the Project is fifty percent (50%) complete if Contractor has performed satisfactorily in accordance with G.S. 143-134.1(b2), contingent upon PWC's receipt of an approval or certification from the Designer that the Work performed by the subcontractor is acceptable and in accordance with the Contract Documents. If PWC determines Contractor's performance is unsatisfactory, PWC may, in its discretion, reinstate retainage for each subsequent periodic application for payment as authorized in this Section up to the maximum amount of five percent (5%). The Project shall be deemed fifty percent (50%) complete when Contractor's gross project invoices, excluding the value of materials stored off-site, equal or exceed fifty percent (50%) of the Price, except the value of materials stored on-site shall not exceed twenty percent (20%) of Contractor's gross project invoices for the purpose of determining whether the Project is fifty percent (50%)

complete. Within 60 days after the submission of a pay request and one of the following occurs, as specified in the Contract Documents, PWC, with written consent of the surety, shall release to Contractor all retainage on payments held by PWC: (i) PWC receives a certificate of Substantial Completion from the Designer in charge of the Project; or (ii) PWC receives beneficial occupancy or use of the Project; provided, however, PWC may in its discretion retain sufficient funds to secure Completion of the Project or corrections on any Work. If PWC retains funds, the amount retained shall not exceed two and one-half times the estimated value of the Work to be completed or corrected. Any reduction in the amount of the retainage on payments shall be with the consent of Contractor's surety. The existence of any third-party claims against Contractor or any additive change orders to the Construction Documents shall not be a basis for delaying the release of any retainage on payments. Notwithstanding anything in this Section to the contrary, following fifty percent (50%) completion of the Project, PWC shall be authorized to withhold additional retainage from a subsequent periodic payment, not to exceed five percent (5%), in order to allow PWC to retain two and one-half percent (2.5%) total retainage through the Completion of the Project. In the event that PWC elects to withhold additional retainage on any periodic payment subsequent to release of retainage on a line-item of Work pursuant to G.S. 143-134.1(b2), Contractor may also withhold from the subcontractors remaining on the project sufficient retainage to offset the additional retainage held by PWC, notwithstanding the actual percentage of retainage withheld by PWC of the Project as a whole. Neither PWC's nor Contractor's release of retainage on payments as part of a payment in full on a line-item of Work pursuant to G.S. 143-134.1(b2) shall affect any applicable warranties on Work done by Contractor or subcontractor, and the warranties shall not begin to run any earlier than either PWC's receipt of a certificate of Substantial Completion from the Designer in charge of the Project or PWC receives beneficial occupancy.

7. Liquidated Damages. Time is of the essence with respect to performance of each of the Parties' obligations under this Agreement. Contractor recognizes and acknowledges that PWC will suffer financial and other losses if the Project is not completed by the Completion Date. The Parties recognize and agree that the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by PWC if the Project is not completed by the Completion Date. Accordingly, instead of requiring any such proof, Contractor and PWC agree that in the event Contractor fails to achieve Completion of the Project by the Completion Date, Contractor shall pay to PWC as liquidated damages to compensate PWC for damages related to the delayed Completion of the Project one thousand dollars ($1000.00) per day ("Liquidated Damages") for each calendar day Contractor fails to achieve Completion of the Project by the Completion Date.

8. Contractor's Representations and Warranties. In order to induce PWC to enter into this Agreement, Contractor makes the following representations and warranties to PWC:

a. Contractor is duly licensed in the State of North Carolina to complete all Work necessary for the Project, is duly organized, validly existing and in good standing and has all requisite powers, rights, and authority to execute, enter into, and perform this Agreement in accordance with the terms and conditions of this Agreement, and this Agreement constitutes a legal, valid, and binding obligation of Contractor enforceable against it in accordance with its terms.

b. Contractor has read the Contract Documents, and acknowledges and understands all data, materials, specifications, and requirements identified in the Contract Documents.

c. Contractor has visited the site for the Project, conducted a thorough, visual examination of the site and adjacent areas, and become familiar with and is satisfied as to the general, local, and site conditions that may affect cost, progress, and performance in completing the Project. Contractor is familiar with and is satisfied as to all laws and regulations that may affect cost, progress, and performance to complete the Project.

d. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the site and all drawings of physical conditions relating to existing surface or subsurface structures at the site that have been identified in the Contract Documents and any accompanying reports and drawings, and (2) reports and drawings relating to hazardous environmental conditions, if any, at or adjacent to the site that have been identified in the Contract Documents and any accompanying reports and drawings.

e. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, if any, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

f. Based on the information and observations referred to in subsection e. of this Section, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Price commencing on the commencement date and in accordance with the other terms and conditions of the Contract.

g. Contractor is aware of the general nature of Work to be performed by PWC and others at the Site that relates to the Work as indicated in the Contract Documents.

h. Contractor has given PWC's Designer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by the Designer is acceptable to Contractor.

i. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

j. Contractor's entry into this Agreement constitutes an incontrovertible representation by Contractor that, without exception, all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

k. Contractor has no business or personal relationship with any PWC Commissioner, officer, director, manager, or supervisor and Contractor covenants to disclose immediately to PWC any such relationship that develops

during the performance of Work on the Project.

9. Contractor's Payment Obligations. Contractor shall pay all of its obligations arising out of or in connection with the Project in a timely manner to all persons supplying materials in the prosecution of the Work and to all laborers and others employed thereon.

10. Performance and Payment Bonds. Contractor shall obtain and deliver to PWC a performance bond in the amount of one hundred percent (100%) of the Price, conditioned upon the faithful performance of the Project and all Work in accordance with the Contract Documents, which bond shall be solely for the protection of PWC. Contractor shall obtain and deliver to PWC a payment bond in the amount of one hundred percent (100%) of the Price, conditioned upon the prompt payment for all labor or materials for which the Contractor or one or more of its subcontractors is liable, which payment bond shall be solely for the protection of the persons furnishing materials or performing labor for which the Contractor is liable. The performance bond and the payment bond shall be executed by one or more surety companies legally authorized to do business in the State of North Carolina, shall become effective upon the awarding of the construction contract by PWC to Contractor, and shall at all times comply with the requirements set forth in Article 3 of North Carolina General Statutes Chapter 44A. In the event PWC deems the surety or sureties upon any bond necessary for this Agreement and the completion of the Project, or if for any reason, such bond ceases to be adequate to cover the performance and/or payment of the Work, Contractor shall, at its expense, within five (5) days after the receipt of notice from PWC, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to PWC. In such event no further payment to Contractor shall be deemed to be due under this Agreement until new or additional security for the performance and payment of the Project shall be furnished in manner and form satisfactory to PWC. Contractor understands and acknowledges that PWC, as a public authority, is not subject to the provisions of Articles 1 and 2 of Chapter 44A of the General Statutes, in accordance with G.S. 44A-34 and applicable law.

11. Contractor's Damage Repair Obligations. Contractor shall be responsible for all damages to the property of the City of Fayetteville and of PWC that may result from the normal procedure of a Responsible Person's actions in the prosecution of the Work or that may be caused by or result from the negligence of a Responsible Person during the progress of or connected with the prosecution of the Work, whether within the limits of the Work or elsewhere. Contractor shall promptly restore all such property so damaged to a condition as good as it was immediately prior to Contractor initiating the Work on the Project.

12. Defective Work. The Project shall be subject to observation and approval by PWC, Designer, and representatives of governmental agencies with jurisdiction over the Project. PWC and Designer shall be entitled to enter at all reasonable times the premises subject to construction or renovation to inspect the Work performed by or on behalf of Contractor, provided that such entry and inspection does not materially interfere with the progress of construction. Contractor shall correct promptly, at no cost to PWC, all Work reasonably rejected by PWC or by its representatives. Should Contractor fail to correct rejected Work, PWC may, acting in its sole discretion, correct such Work and the Contractor shall pay PWC's actual costs of correction and any other applicable amounts identified in the Contract Documents.

13. As-Built Drawings. Contractor shall maintain during the progress of the Project as-built drawings indicating the current status of the Project as actually performed. Upon Completion of the Project, Contractor shall prepare a final version of such as-built drawings and

submit them to PWC for approval.

14. Assignment. This Agreement shall be binding upon and inure to the benefit of the Parties, their legal representatives, successors, and assigns. Contractor may not assign, transfer, convey, or encumber, whether voluntarily or by operation of law, this Agreement or any obligations, rights under, or interests in this Agreement to a third party without the prior written consent of PWC; and, specifically, but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

15. Indemnity. Contractor shall indemnify, defend, and hold harmless PWC and its Commissioners, officers, employees, agents, and representatives and the City of Fayetteville and its elected officials, managers, employees, agents, and representatives and Design Engineer (collectively "Indemnitees") from and against all claims, actions, liabilities, damages, losses, costs, and expenses (including, without limitation, injury to or death of any persons and damage to property, economic and consequential damages and attorneys' fees) asserted by one or more third parties against one or more of the Indemnitees if the Fault of one or more Responsible Persons is a proximate cause of the loss, damage, or expense indemnified. Contractor's obligation to indemnify, defend, and hold harmless the Indemnitees shall survive the termination of this Agreement.

16. Insurance. Contractor shall maintain during the Work and for at least three (3) years following Completion of the Project the insurance coverage set forth in the Contract Documents, which insurance shall be placed with insurance companies authorized to do business in the State of North Carolina and rated A minus VII or better by the current edition of Best's Key Rating Guide or otherwise approved in writing by PWC. Prior to initiating any Work, Contractor shall deliver certificates of insurance confirming each such coverage required by the Contract Documents, and Contractor shall direct its insurers to provide annually to PWC certificates confirming each such coverage during the coverage period. PWC shall be named as an additional insured in the comprehensive automobile and commercial liability insurance policies. Commercial general liability coverage shall be written on an "occurrence" basis. Contractor shall not reduce or allow the required insurance coverages to lapse without PWC's prior written approval. All policies for insurance must be endorsed to contain a provision giving PWC a thirty (30) calendar day prior written notice by certified mail of any cancellation of that policy or material reduction in coverage. Should a notice of cancellation be issued for non-payment of premiums or any part thereof, or should Contractor fail to provide and maintain certificates as set forth herein, PWC shall have the right, but shall not have the obligation, to pay such premium to the insurance company or to obtain such coverage and to deduct such payment from any sums that may be due or become due to Contractor, or to seek reimbursement for said payments from Contractor. Any such sums paid by PWC shall be due and payable immediately by Contractor upon notice from PWC. The insurance provisions of this Agreement shall not be construed as a limitation on Contractor's responsibilities and liabilities pursuant to the terms and conditions of this Agreement. Contractor's obligation to maintain insurance for three (3) years after Completion of the Project shall survive the termination of this Agreement.

17. Warranty. The Contractor hereby grants to PWC a warranty on all materials and Workmanship involved in the Project for a period of one (1) year from the Completion Date and a period of two (2) years from the Completion Date for any latent structural defects. PWC shall

give written notice to Contractor of any claim under this Section within the time specified hereinabove. This warranty shall be in addition to, and not in derogation of, all other rights and privileges which PWC may have under law, equity, or instrument, and shall survive the Completion Date and the final settlement and shall be binding on Contractor notwithstanding any provision in any other writing executed by PWC heretofore or contemporaneous with the execution of the Agreement or prior to the Completion Date.

18. Waiver. No failure on the part of any party to exercise, and no delay in exercising, any right, power, or privilege hereunder shall operate as a waiver thereof, nor shall any single or partial exercise of any right hereunder preclude any other or further cumulative and not exclusive of any remedies provided by law. This Agreement shall be binding upon and inure to the benefit of the parties, their legal representatives, successors, and assigns. This Agreement may not be assigned, transferred, conveyed, or encumbered, whether voluntarily or by operation of law, by either party without the prior written consent of the other party, which consent shall not be unreasonably withheld.

19. Law. THIS AGREEMENT SHALL BE GOVERNED BY AND INTERPRETED AND ENFORCED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NORTH CAROLINA WITHOUT GIVING EFFECT TO THE CHOICE OF LAW PROVISIONS THEREOF. The Contractor shall at all times comply with all applicable Federal, state, and local laws and building codes in the performance of its obligations under the Agreement.

20. Dispute Resolution. In the event of any dispute, controversy, or claim of any kind or nature arising under or in connection with this Agreement (a “Dispute”) and involving any two or more of the following parties, PWC, Designer, Contractor or any subcontractor of Contractor, the party initiating the Dispute shall serve written notice of a Dispute on the party(ies) to the dispute, and those parties shall endeavor to settle the dispute first through direct, informal discussions between the parties’ selected representatives. Any such representative(s) shall have binding authority to settle the Dispute. In the event the parties do not settle the Dispute within ten (10) days from the date of written notice of the Dispute, any party to the Dispute may, by written notice to the other party(ies), engage a mediator certified under the laws of the State of North Carolina to mediate the Dispute within thirty (30) days of such notice. The parties to the Dispute shall attend mediation in good faith. In the event mediation is unsuccessful, any party to the dispute may initiate arbitration proceedings. Any controversy or claim arising out of or relating to the Contract Documents, or the breach thereof, shall be settled by binding arbitration administered by the American Arbitration Association under its Construction Industry Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof. All of the foregoing dispute resolution procedures shall be held in Cumberland County, North Carolina. The costs of the mediator and arbitrator in a dispute resolution process shall be divided equally among the parties to the process; provided, however, PWC shall bear at least one-third of the cost if PWC is a party to the dispute resolution and the remainder of the cost shall be divided equally among the other parties participating in the dispute resolution. PWC shall, in its contractual arrangements with Designer, and Contractor shall, in its contracts with subcontractors and they in their contracts with lower-tier subcontractors authorize and direct such parties to participate in the dispute resolution procedures set forth in this Section. Unless otherwise directed in writing by PWC, Contractor shall continue the Project and maintain compliance with the scheduling deadlines set forth in the Contract Documents during any dispute resolution proceedings. If Contractor continues to perform, PWC shall make payments due for the continued performance in accordance with this Agreement. The provisions of this Section shall not extend any applicable statutes of limitation or repose.

21. Execution; Modification; Entire Agreement; Severability. This Agreement may be executed in counterparts with the same effect as if the signatures to each counterpart were upon a single instrument, and all such counterparts together shall be deemed an original of this Agreement. For purposes of this Agreement, a facsimile copy or scanned copy or photocopy of a party's signature shall be sufficient to bind such party. This Agreement shall be subject to execution by electronic means in accordance with Article 40 of Chapter 66 of the North Carolina General Statutes. No oral communication, promise, understanding, or agreement before, contemporaneous with, or after the execution of this Agreement shall affect or modify any of the terms and conditions and obligations of the Contract Documents. The Contract Documents shall be modified only by a subsequent writing signed by both Parties. The Contract Documents shall be conclusively considered to contain and express all the terms and conditions agreed upon by the Parties, notwithstanding any prior or contemporaneous written communication, promise, understanding or agreement. Should any provision of this Agreement or any of the Contract Documents at any time be in conflict with any law, statute, rule, regulation, order, or ruling and thus be unenforceable, or be unenforceable for any other reason, then the remaining provisions of this Agreement shall remain in full force and effect and the court or arbitrator shall give the offending provision the fullest meaning and effect permitted by law. The titles of the Sections throughout this Agreement are for convenience only and the words contained therein shall in no way be held to explain, modify, amplify or aid in the interpretation, construction, or meaning of the provisions of this instrument.

22. Notices. Any notice which either Party is required or desires to give the other hereunder shall be deemed sufficiently given if, in writing, it is delivered personally, or sent by certified U.S. mail, return-receipt requested, postage prepaid, to the addresses listed herein below, or such other address as either Party shall give to the other Party by written notice in accordance herewith. Any notice given herein by personal delivery shall be deemed delivered when received. Any properly addressed notice given herein by certified mail shall be deemed delivered on third Business Day after the same is deposited in an official United States Post Office, postage prepaid, or if sooner upon the date when the return receipt therefore is signed, or refusal to accept the mailing by the addressee is noted thereon by the postal authorities.

To PWC:
Fayetteville Public Works Commission
Attn: Timothy Bryant, CEO/General Manager
PO Box 1089
Fayetteville, NC 28302

To Contractor:

23. Termination. PWC may terminate this Agreement immediately if during the progress of the Work or during the warranty period, the Contractor:

a. Persistently fails to prosecute the Work properly and in accordance with this contract, including but not limited to include failure to provide sufficient crews, equipment, or resources, or failure to adhere to the schedule;

b. Demonstrates disregard for the policies, procedures, or requirements of PWC;

c. Demonstrates complete disregard of the authority of PWC or its designated representatives; or

d. Violates in any substantial way the provisions and requirements of this Agreement.

Such termination shall be effective upon written notice to Contractor and its surety. PWC may terminate the contract for its convenience by providing Contractor at least seven (7) calendar days prior written notice, in which event Contractor shall be paid for all Work completed, plus other expenses as mutually agreed upon between PWC and Contractor.

24. Compliance. Contractor hereby acknowledges that "E-Verify" is the federal E-Verify program operated by the US Department of Homeland Security and other federal agencies which is used to verify the Work authorization of newly hired employees pursuant to federal law and in accordance with Article 2, Chapter 64 of the North Carolina General Statutes. Contractor further acknowledges that all employers, as defined by Article 2, Chapter 64 of the North Carolina General Statutes, must use E-Verify and after hiring an employee to Work in the United States, shall verify the Work authorization of the employee through E-Verify in accordance with N.C.G.S. §64-26(a). Contractor hereby pledges, attests, and warrants through execution of this Agreement that Contractor complies with the requirements of Article 2, Chapter 64 of the North Carolina General Statutes and further pledges, attests, and warrants that all subcontractors currently employed by or subsequently hired by Contractor shall comply with all E-Verify requirements. Failure to comply with the above requirements shall be considered a breach of this Agreement. Contractor hereby further acknowledges that the execution and delivery of this Agreement constitutes Contractor's certification to PWC and to the North Carolina State Treasurer that, as of the date of the Effective Date of this Agreement, Contractor is not listed on (a) the Final Divestment List created and maintained by the North Carolina Department of State Treasurer pursuant to the Iran Divestment Act of 2015, Chapter 147, Article 6E of the General Statutes of North Carolina (the "Iran Divestment Act"); or (b) the list of companies that the North Carolina State Treasurer determines to be engaged in a boycott of Israel in accordance with Article 6G of Chapter 147 of the General Statutes of North Carolina. Contractor represents and warrants to Commission that Contractor, and all persons and entities owning (directly or indirectly) an ownership interest in it: (i) are not, and will not become, a person or entity with whom a party is restricted from doing business with under regulations of the Office of Foreign Asset Control ("OFAC") of the Department of the Treasury (including, but not limited to, those named on OFAC's Specially Designated and Blocked Persons list) or under any statute, executive order (including, but not limited to, the September 24, 2001, Executive Order 13224 Blocking Property and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism), or other governmental action; and (ii) are not knowingly engaged in, and will not knowingly engage in, any dealings or transactions or be otherwise associated with such persons or entities described in clause (i) above. Contractor also shall at all times during the term of this Agreement comply with Executive Order 11246, including but not limited to the Equal Opportunity Clause requirements set forth in 41 C.F.R. § 60-1.4. Contractor shall abide by the requirements of 41 CFR 60–300.5(a) and 60–741.5(a) prohibiting discrimination against qualified individuals on the basis of protected veteran status or disability and requiring affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans and individuals with disabilities.

IN WITNESS WHEREOF, the Parties have executed this Agreement by their duly authorized representatives.

Fayetteville Public Works Commission

[PER OUR CHARTER (SEE SEC 6A.20), THE CONSTRUCTION CONTRACT, IF MORE THAN $500K, MUST BE BETWEEN THE CITY (BY AND THROUGH PWC) AND THE CONTRACTOR]

By:_____
Timothy Bryant, CEO/GM

Date: _____

CONTRACTOR

By:_____

_____
(Printed Name, Title)

Date: _____

This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act (N.C. Gen. Stat. § 159-1 et seq.).

By:_____
Rhonda Haskins, Chief Financial Officer

Approved as to form:

_____
Legal Dept.

GENERAL CONDITIONS FOR
FAYETTEVILLE PUBLIC WORKS COMMISSION

General Conditions

Article I. Definitions and Terminology

Section 1.01 Definitions

Capitalized terms used in the Bid Documents or Contract Documents, including the singular and plural forms, shall have the meaning indicated in the definitions below. In addition to terms specifically defined below, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

(a) Addenda—Written or graphic instruments issued before the opening of Bids which clarify, correct, or change the Bid Documents or other Contract Documents.

(b) Agreement—The written instrument, executed by PWC and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties, designates the specific documents that encompass the Contract Documents, and provides other material provisions that govern the relationship between the parties as it relates to the Project. The Agreement is also referred to, and titled as, the “Construction Agreement.”

(c) Application for Payment—The form that Contractor shall use during the Work in requesting progress or final payments. Any Application for Payment shall be accompanied by such supporting documentation as is required by the Contract Documents.

(d) Bid—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

(e) Bidder—An individual or entity that submits a Bid to PWC for the Project.

(f) Bid Documents—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

(g) Bidding Requirements—The Invitation to Bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bidder’s original Bid with any requisite attachments.

(h) Business Day—each calendar day that is not a Saturday, Sunday, or holiday observed by PWC (New Year’s Day, Martin Luther King, Jr. Day, Good Friday, Memorial Day, Independence Day, Labor Day, Veteran’s Day, Thanksgiving Day (and the day after), and Christmas (2 days) for its employees.

(i) Change Order—A document that is signed by Contractor and PWC, which authorizes an addition, deletion, or revision in the Work, an adjustment in the Contract Price or the Contract Times, a change in the scope of the Project, or other revision to the Agreement, issued on or after the Effective Date of the Agreement.

(j) Change Proposal—A written request by Contractor, submitted in compliance with the procedural requirements set forth in the Contract Documents, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by PWC concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Agreement.

(k) Completion of the Project—Has the meaning as set forth in the Construction Agreement.

(l) Constituent of Concern—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

(m) Contract Price—The money that PWC has agreed to pay Contractor for Completion of the Project in accordance with the Contract Documents. May also be referred to as "Price" throughout the Contract Documents.

(n) Contract Times—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; and (b) Completion of the Project.

(o) Contractor—The individual or entity with which PWC has contracted for performance of the Work and Completion of the Project.

(p) Day—a calendar day of 24 hours measured from midnight to the next midnight. Also referred to throughout the Contract Documents as "days" or "calendar days."

(q) Design Engineer—The Engineering firm identified on the Contract Drawings and their duly authorized employees and agents, such employees and agents acting within the scope of the particular duties entrusted to them in each case.

(r) Drawings—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

(s) Field Order—A written order issued by Project Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

(t) Final Completion—The day the on which any specified Work is complete in accordance with the Contract Documents.

(u) Hazardous Environmental Condition—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract Documents, does not establish a Hazardous Environmental Condition.

(v) Laws and Regulations; Laws or Regulations—Any and all applicable laws, statutes, rules,

regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction. Such terms, unless otherwise specified, shall refer to North Carolina laws and regulations.

(w) Milestone—A principal event in the performance of the Work that the Agreement requires Contractor to achieve by an intermediate completion date or by a time prior to Completion of the Project.

(x) Non-Compliance Notice—A written notice issued by PWC to Contractor indicating a violation of any term, provision, or requirement of the Contract Documents.

(y) Notice of Award—The written notice by PWC to a Bidder providing of PWC's acceptance of the Bid upon timely compliance by the Bidder with any conditions precedent provided in the notice.

(z) Notice to Proceed—A written notice by PWC to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

(aa) Progress Schedule—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

(bb) Project—has the meaning ascribed to it in the Agreement and is as more specifically set forth throughout the Contract Documents. "Project" includes the total undertaking to be accomplished for PWC by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

(cc) Project Engineer—the PWC employee assigned by PWC to coordinate, manage, monitor, and otherwise perform the administration necessary and consistent with PWC's responsibilities for the Completion of the Project. The Project Engineer has authority to coordinate and work with the Design Engineer regarding any engineering questions, concerns, revisions, alterations, deletions, or additions to the Work, and has authority to approve any changes in the scope of the Work. Project Engineer may assign a "Project Coordinator" who will also be an employee of PWC and have the duties and responsibilities set by the Project Engineer.

(dd) PWC—Fayetteville Public Works Commission. PWC may also be referred to in the Contract Documents as "Owner."

(ee) Samples—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

(ff) Schedule of Submittals—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Project Engineer's review of the submittals and the performance of related construction activities.

(gg) Schedule of Values—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

(hh) Shop Drawings—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Contract Drawings and are not Contract Documents.

(ii) Site—Lands or areas indicated in the Contract Documents as being furnished by PWC upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by PWC which are designated for the use of Contractor.

(jj) Specifications—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

(kk) Subcontractor—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

(ll) Substantial Completion—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Project Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.

(mm) Successful Bidder—The Bidder whose Bid PWC accepts, and to which PWC provides a Notice of Award.

(nn) Supplementary Conditions—Any part of the Agreement that amends or supplements these General Conditions.

(oo) Supplier—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

(pp) Technical Data—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

(qq) Underground Facilities—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

(rr) Unit Price Work—Work to be paid for on the basis of unit prices.

(ss) Work—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, materials, equipment, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents and necessary to achieve Completion of the Project.

(tt) Work Change Directive—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by PWC and recommended by the Project Engineer, ordering an addition, deletion, or revision in the Work.

Section 1.02 Terminology

The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

(a) Intent of Certain Terms or Adjectives:

(i) The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Project Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Project Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Project Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions the Contract Documents.

(b) Defective—when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:

(i) does not conform to the Contract Documents; or
(ii) does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
(iii) has been damaged prior to Project Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by PWC at Substantial Completion in accordance with the Contract Documents).

(c) Furnish, Install, Perform, Provide

(i) The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
(ii) The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment

complete and ready for intended use.

(iii) The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

(iv) If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

Article II. Preliminary Matters

Section 2.01 Delivery of Bonds and Evidence of Insurance

(a) Bonds: Contractor shall deliver to PWC such bonds as Contractor is required to furnish simultaneously with delivering the executed Agreement to PWC.

(b) Contractor’s Insurance: Contractor shall deliver to PWC the certificates and other evidence of the insurance required by the Contract Documents simultaneously with delivering the executed Agreement to PWC.

Section 2.02 Copies of Documents

(a) PWC will furnish to Contractor up to five (5) printed copies of the Contract Documents upon request by Contractor, and one (1) copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

(b) PWC will maintain and safeguard at least one original printed record version of the Agreement, including Drawings and Specifications signed and sealed by Design Engineer or other design professionals as applicable. PWC agrees to make such original printed record version of the Agreement reasonably available to Contractor for review during PWC’s normal business hours. PWC may delegate the responsibilities under this provision to Design Engineer.

Section 2.03 Before Starting any Work

(a) Within ten (10) Days after the Contractor receives the Notice of Award from PWC (or as otherwise specifically required by the Contract Documents), Contractor shall submit to PWC for timely review:

(i) a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the identifiable aspects of the Work, including any Milestones specified in the Contract Documents;

(ii) a preliminary Schedule of Submittals; and

(iii) Any Shop Drawings, Samples, and other submittals required by the Contract Documents before the Preconstruction Conference.

Section 2.04 Preconstruction Conference; Designation of Authorized Representatives

(a) Before any Work at the Site is started, a preconstruction conference attended by PWC, Project Engineer, Contractor, Design Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss general Project issues including, but not limited, the following:
  (i) The schedules and submittals referred to in Section 2.03;
  (ii) Contractor's designated authorized representative as described in Section 2.04(b);
  (iii) Safety;
  (iv) Procedures for handling Shop Drawings, Samples, and other submittals;
  (v) Processing Applications for Payment, electronic or digital transmittals;

(b) At the preconstruction conference Contractor shall designate, in writing, a specific individual to act as its authorized representative with respect to its services and responsibilities under the Contract Documents. Such individual shall have the authority to transmit and receive information, render decisions relative to the requirements of the Contract Documents, and otherwise act on behalf of the Contractor.

Section 2.05 Initial Acceptance of Schedules

(a) At least twenty (20) Days before submission of the first Application for Payment a conference, attended by Contractor, PWC, and others as appropriate, will be held to review for acceptability to Project Engineer as provided below the schedules submitted in accordance with Paragraph 2.03(a). PWC shall have ten (10) Days to review the submission and provide feedback to Contractor. Contractor shall then have ten (10) days to make any corrections and adjustments as indicated by PWC and to complete and resubmit the schedules as necessary. No progress payment shall be made to Contractor until acceptable schedules are submitted to and approved by Project Engineer.

(b) The Progress Schedule will be acceptable to Project Engineer if it provides an orderly progression of the Work to achieve Completion of the Project within the Contract Times. Such acceptance will not impose on Project Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

(c) Contractor's Schedule of Submittals will be acceptable to Project Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

Section 2.06 Electronic Transmittals

(a) Except as otherwise stated elsewhere in the Contract Documents, PWC and Contractor and their authorized agents may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through electronic mail at the address(es) designated by each Party.

(b) When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

Article III. Contract Documents: Intent, Requirements, Reuse

Section 3.01 Intent

(a) The Contract Documents are complementary; what is required by one is as binding as if required by all.

(b) It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

(c) Project Engineer, Design Engineer, or both, will issue clarifications and interpretations of the Contract Documents as provided herein.

(d) To the extent necessary that Work, construction, or conditions not covered by these General Conditions is required for Contractor to achieve Completion of the Project, "Special Conditions" for such Work will be provided to Contractor and shall be part of the Contract Documents.

(e) In case of any inconsistency, conflict, or ambiguity among the Contract Documents, the documents shall govern in the following order: (1) Change Orders; (2) Addenda; (3) the fully executed Agreement; (4) Special Conditions; (5) any Drawings and Technical Specifications; and (6) General Conditions.

Section 3.02 Reference Standards

(a) Standards Specifications, Codes, Laws and Regulations

(i) Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or North Carolina laws and regulations in effect as of the Effective Date of the Agreement, except as may be otherwise specifically stated in the Contract Documents.

(ii) No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of PWC or Contractor, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to PWC or any of its officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents.

Section 3.03 Reporting and Resolving Discrepancies

(a) Contractor's Verification of Figures and Measurements

(i) Before undertaking any portion of the Work, Contractor shall review all of the Contract Documents to and check and verify all figures and dimensions for the Project. Contractor shall promptly report in writing to Project Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is

resolved, by a clarification or interpretation by Project Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to these General Conditions.

(ii) If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Project Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as defined hereinafter) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Project Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to these General Conditions.

(b) Resolving Discrepancies:

(i) Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for PWC shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

1) the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
2) the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

Section 3.04 Reuse of Documents

(a) Contractor and its Subcontractors and Suppliers shall not have or acquire any title to or ownership rights in any of the:

(i) Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Design Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of PWC and Design Engineer and specific written verification or adaptation by Design Engineer, where applicable; or

(ii) Contract Documents and shall not reuse any such Contract Documents for any purpose without PWC's express written consent.

(b) The prohibitions of this provision shall survive final payment or termination of the Agreement. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

Article IV. Commencement and Progress of the Work

Section 4.01 Commencement of Work

(a) The Contract Times will commence to run on the day indicated in the Notice to Proceed issued by PWC to Contractor. A Notice to Proceed may be given at any time after the Effective Date of the Contract.

(b) Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date. Contractor's failure to commence the Work within fifteen (15) Days of the date stated in the Notice to Proceed shall be deemed a material breach of the Agreement unless PWC otherwise determines in its sole discretion and agrees in writing to a delay of the Contract Times based on the applicable circumstances.

Section 4.02 Reference Points

(a) Construction staking will be performed by Design Engineer, who will also prepare and furnish construction cut sheets, signed and sealed by a North Carolina professional land surveyor, to PWC and Contractor. Contractor shall not install any utilities without a sheet. All requests for staking shall be made not less than 96 hours in advance.

(b) Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and staking, and shall make no changes or relocations without the prior written approval of Project Engineer. Contractor shall report to Project Engineer whenever any reference point staking is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or staking by professionally qualified personnel.

Section 4.03 Progress Schedule

(a) Contractor shall adhere to the Progress Schedule established in accordance with Section 2.03 as it may be adjusted from time-to-time as provided below. Contractor shall submit to Project Engineer for acceptance any proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article IX.

(b) Contractor shall carry on the Work and adhere to the Progress Schedule during any disputes or disagreements with PWC. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by these General Conditions or as PWC and Contractor may otherwise agree in writing.

Section 4.04 Delays in Contractor's Progress

(a) If PWC, Project Engineer, anyone for whom PWC is responsible, or a Force Majeure Event delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

(b) Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

(c) Contractor must submit any Change Proposal, consistent with the procedure set forth in Article IX, seeking an adjustment in Contract Price or Contract Times under this provision within ten (10) calendar days of the commencement of the event that causes the delay, disruption, or interference with the Work and Contract Times.

Article V. Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions

Section 5.01 Availability of Lands

(a) PWC will be responsible for obtaining any required easements and encroachments, and otherwise furnishing the Site, necessary to complete the Work, except as provided elsewhere in the Contract Documents.

(b) Upon reasonable written request, PWC shall furnish to Contractor a current statement of record legal title and legal description of the lands upon which the Work is to be completed and PWC's interest therein.

(c) Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment necessary to complete the Work. Any and all agreements between the Contractor and any individual property owner(s) shall not obligate PWC, PWC's employees, Project Engineer, or Design Engineer in any manner, and Contractor shall, before performing any work on any such property, obtain a signed and notarized release of liability of PWC and Design Engineer that is suitable to PWC as confirmed in writing.

(d) Contractor and any of its Subcontractors shall exercise care and caution to avoid damage to any private property. Should any such damage to private property occur, it is Contractor's responsibility to notify the Project Engineer promptly in writing that such damage occurred, the extent of the damage, and Contractor's written plan to remedy the damage. If Contractor fails to timely correct damage to private property, PWC reserves the right to withhold progress payments until damage is corrected and/or to correct damage and back-charge Contractor for costs incurred. At the Completion of the Project, Contractor shall obtain a signed release from all owners of private property to which damage occurred that releases PWC and Design Engineer and acknowledges a settlement for the damage or that such damage was adequately remedied.

Section 5.02 Use of Site and Other Areas

(a) Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site and other adjacent areas permitted by Laws and Regulations and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

(b) Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris during the progress of the Work. Removal and disposal of such debris shall conform to applicable Laws and Regulations.

(c) Prior to Completion of the Project, Contractor shall clean the Site and the Work and make it ready for utilization by PWC. At the completion of all of the Work, Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

(d) Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

Section 5.03 Differing Subsurface or Physical Conditions or Underground Facilities

(a) If Contractor believes that any subsurface or physical condition or Underground Facilities that is uncovered or revealed at the Site either:

(i) is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely is materially inaccurate;
(ii) is of such a nature as to require a change in the Contract Documents;
(iii) differs materially from that shown or indicated in the Contract Documents; or
(iv) is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or Underground Facilities or performing any Work in connection therewith, notify PWC and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement approved by PWC permitting Contractor to do so.

(b) After receipt of Contractor's written notice, Project Engineer will review the subsurface or physical condition or Underground Facilities in question; determine the necessity of PWC obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any of the differing site condition categories in this Section5.03; and obtain any pertinent cost or schedule information from Contractor.

(c) Project Engineer will issue a written statement to Contractor regarding the subsurface or physical condition or Underground Facilities in question, which addresses the resumption of Work in connection with such condition and indicates whether any change in the Contract Documents will be made.

(d) Possible Price and Times Adjustments:

(i) Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition or Underground Facilities, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

1) such condition must fall within at least one of the categories in this Section 5.03; and,
2) Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

(ii) Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition or Underground Facilities if:

1) Contractor knew of the existence of such condition at the time Contractor proffered its Bid to PWC or executed the applicable Agreement for the Project; or
2) the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's Bid; or
3) Contractor failed to give the written notice as required.

(iii) If PWC and Contractor agree regarding Contractor's entitlement to, and the amount or extent of, any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

(iv) Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 calendar days after Project Engineer's written statement to Contractor regarding the subsurface or physical condition or Underground Facilities in question.

Section 5.04 Underground Utilities

(a) Contractor shall ascertain the location and type of all underground utility lines or structures that may be located within the limits of the Site or any area where Work is to be performed.

(i) The exact location of underground utilities or structures may vary from prior plans, permits, maps, or other documentation, and others may not be designated. The Contractor is fully responsible for verification of the exact location of all underground utility lines or structures within the limits of the Site or the area where the work is to be performed, whether known or unknown by PWC, and for providing necessary protection and/or repair if damage.

(ii) Should uncharted or incorrectly charted piping or other utilities be encountered during excavations, the Contractor shall immediately halt any Work, notify PWC, and await direction from PWC before proceeding with any Work. The Contractor shall fully cooperate with PWC and any other utility company in keeping respective services and facilities in operation.

(b) PWC has used reasonable care to locate and depict existing underground installation on the construction drawings, but the accuracy cannot be guaranteed, and some items may not be shown which exist. Actual horizontal and vertical locations have not been verified. As part of the Work, the Contractor is required to dig up each utility which may conflict with construction in advance to verify locations. The utilities shall be "dug up" a minimum of fourteen (14) Days in advance of actual installation of new utilities to allow PWC an opportunity to adjust grades and alignments, to avoid a conflict, and to address

any other issues.

(c) The Contractor shall adhere to the provisions of the North Carolina Underground Utility Safety and Damage Prevention Act. The Contractor shall make a documented request to the North Carolina One Call Center, and/or individual utility owners, in order to locate any facilities within the Site limits or any area where Work is to be performed at least forty-eight (48) hours in advance of the day the Work is scheduled to begin. The Contractor shall include the cost of any coordination and cooperation for utilities in its Bid.

(i) Location assistance requested from PWC by Contractor should include the actual horizontal location, type number, size, and depth of all lines. All costs associated with locating and marking existing utilities or the utilities representatives shall be the responsibility of the Contractor.

(ii) The Owner, Project Engineer, Design Engineer, and/or Consultants shall not be liable to the Contractor for any claims, costs, losses, or damages incurred or sustained on or in connection with locating existing underground installations.

(d) If the Contractor fails to schedule locates or perform advance physical locations in advance of the construction and a conflict arises, the Contractor will be required to make corrective measures as instructed by the Project Engineer at the Contractor's expense. The Contractor's failure to advance plan (minimum fourteen (14) days) by physically uncovering existing utilities in advance of construction shall not be cause for claim of lost time or for additional compensation. No additional payment will be made for re-mobilization required by the utility locator.

(i) The Contractor shall inform all equipment operators, either those employed by him or those employed by his subcontractors, of information obtained from the utility owners prior to initiation of any aspect of any Work.

(e) PWC and Design Engineer shall not be responsible for the accuracy or completeness of any information or data provided to the Contractor with respect to underground facilities.

(f) The entire cost of all of the following will be included in the Contract Price, and Contractor shall bear full responsibilities for all such costs, including but not limited to:

(i) Reviewing and checking all such information and data;

(ii) Locating all underground facilities shown or indicated in the Contract Documents;

(iii) Coordination of the Work with the owners of such underground facilities, including PWC, during any portion of the Work; and

(iv) The safety and protection of all such underground facilities and repairing any damage thereto resulting from the Work.

(g) Contractor shall be responsible for the discovery of existing underground installations, in advance of any excavating or trenching as required in the Contract Documents.

(h) If an underground facility is discovered at or contiguous to the Site that was not shown or indicated in the Contract Documents or of which Contractor was not aware prior to starting that portion of any Work, Contractor shall, immediately after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency), identify the owner of such underground facility and give written notice to PWC. Upon receipt of written notice, PWC will review the pertinent condition, determine the necessity of obtaining additional information, and advise Contractor in writing. During such time, Contractor shall be responsible for the safety and protection of such underground facility. If PWC concludes that a change in the Contract Documents is required, a Change Order will be issued.

(i) The Contract Price and/or the Contract Time, may be adjusted if PWC determines, in its discretion, that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work subject to the following:

1) Facility was not shown or indicated in the Contract Documents, and
2) The Contractor did not know of or could not anticipate the facility.

Section 5.05 Hazardous Environmental Conditions at Site

(a) Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work or Hazardous Environmental Condition was caused by Contractor.

(b) Contractor shall be responsible for controlling, containing, and removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

(c) If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency); and (3) immediately notify Project Engineer (and promptly thereafter confirm such notice in writing). Project Engineer will evaluate such condition or take corrective action, if any. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then PWC may have the Hazardous Environmental Condition removed and remediated and impose a set-off against payments to Contractor to account for the reasonable associated costs.

(d) Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after PWC has delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

(e) If PWC and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within thirty (30) calendar days of PWC's written notice regarding the resumption of Work, Contractor may submit a Change Proposal or PWC may impose a set-off.

(f) If after receipt of such written notice Contractor does not agree to resume such Work based on reasonable evidence it is unsafe or does not agree to resume such Work under such special conditions, then PWC may order the portion of the Work that is in the area affected by such condition to be deleted from the Work.

Article VI. Bonds and Insurance

Section 6.01 Performance and Payment Bonds

(a) Contractor shall obtain and furnish to PWC a performance bond in the amount of one hundred percent (100%) of the Contract Price, conditioned upon the faithful performance of the Project and all Work in accordance with the Contract Documents, which bond shall be solely for the protection of PWC.

(b) Contractor shall obtain and furnish to PWC a payment bond in the amount of one hundred percent (100%) of the Contract Price, conditioned upon the prompt payment for all labor or materials for which the Contractor or one or more of its subcontractors is liable, which payment bond shall be solely for the protection of the persons furnishing materials or performing labor for which the Contractor is liable.

(c) The performance bond and the payment bond shall be executed by one or more surety companies legally authorized to do business in the State of North Carolina, shall become effective upon the awarding of the construction contract by PWC to Contractor, and shall at all times comply with the requirements set forth in Article 3 of North Carolina General Statutes Chapter 44A.

(d) In the event PWC deems the surety or sureties upon any bond necessary for the Agreement and the completion of the Project, or if for any reason, such bond ceases to be adequate to cover the performance and/or payment of the Work, Contractor shall, at its expense, and within ten (10) days after the receipt of notice from PWC, furnish such additional bond(s) in such form and amount, and with such surety or sureties, as shall be satisfactory to PWC. In such event no further payment to Contractor shall be deemed to be due under this Agreement until new or additional security for the performance and payment of the Project shall be furnished in manner and form satisfactory to PWC.

(e) By executing the Agreement, Contractor understands and acknowledges that PWC, as a public authority, and the City, as a municipal corporation, are not subject to the provisions of Articles 1 and 2 of Chapter 44A of the General Statutes, in accordance with G.S. 44A-34 and applicable law.

Section 6.02 Insurance

(a) Contractor shall maintain during the life of the Agreement and during the completion of any Work the following insurance coverages, which insurance shall be placed with insurance companies authorized to do business in the State of North Carolina and rate A minus VII or

better by the current edition of Best's Key Rating Guide or otherwise approved in writing by PWC:

(i) Commercial general liability insurance with limits of $1,000,000 per occurrence, $2,000,000 aggregate other than products/completed operations; $2,000,000 aggregate for products/completed. Commercial general liability coverage shall be written on an "occurrence" basis.

(ii) Automobile liability insurance in an amount not less than $1,000,000 combined single limit per accident for bodily injury and property damage from owned, non-owned, and hired automobiles.

(iii) Workers' compensation insurance as required by the Laws and Regulations. In the event any employee(s), contractor(s), or subcontractor(s) engaged to perform any Work under the Agreement is not protected under the applicable workers' compensation laws, the Contractor shall provide adequate coverage for the protection of such employee(s), contractor(s), or subcontractor(s) not otherwise protected.

(iv) In the event the Project concerns building construction or repair work, Contractor shall purchase and maintain "Builder's Risk" insurance. This insurance shall include the interests of the PWC, Contractor, and any Subcontractor(s) and shall be written on a one hundred percent (100%) completed value basis (full value as of the date that all construction is finished and includes the Contractor's Contract Price), and to remain in force until Completion of the Project.

(v) Regardless of the nature of the work to be performed, coverage must also be provided for the theft or damage of building materials and supplies, which are not permanently attached or stored on Site for any period of time. This coverage shall be an "Installation Floater." If no building construction or repair is involved for the Project, the amount of the coverage shall equal the value of the materials stored on site.

(b) Prior to initiating any Work on the Project, Contractor shall deliver certificates of insurance confirming each such coverage set forth above, and Contractor shall direct its insurers to provide annually to PWC certificates confirming each such coverage during the coverage period.

(c) PWC shall be named as an additional insured in the comprehensive automobile and commercial liability insurance policies.

(d) Contractor shall not reduce or allow the required insurance coverages to lapse without PWC's prior written approval. All policies for insurance must be endorsed to contain a provision giving PWC a thirty (30) calendar day prior written notice by certified mail of any cancellation of that policy or material reduction in coverage. Should a notice of cancellation be issued for non-payment of premiums or any part thereof, or should Contractor fail to provide and maintain certificates as set forth herein, PWC shall have the right, but shall not have the obligation, to pay such premium to the insurance company or to obtain such coverage and to deduct such payment from any sums that may be due or become due to Contractor, or to seek reimbursement for said payments from Contractor. Any such sums paid by PWC shall be due and payable immediately by Contractor upon notice from PWC.

(e) The insurance coverage requirements shall not be construed as a limitation on

Contractor's responsibilities and liabilities pursuant to the terms and conditions of this Agreement. Contractor's obligation to maintain insurance for three (3) years after Completion of the Project shall survive the termination of this Agreement.

(f) If Contractor fails to obtain and maintain any required insurance, PWC may exclude Contractor from the Site, impose an appropriate set-off against payment, and exercise PWC's termination rights pursuant to the Contract Documents.

(g) PWC does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

Article VII. Contractor's Responsibilities

Section 7.01 Supervision and Superintendence

(a) Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction subject to the terms, provisions, and specifications set forth in the Contract Documents.

(b) At all times during the progress of the Work, Contractor shall assign a competent superintendent, satisfactory to Project Engineer, to supervise the Work and to respond to Project Engineer concerning PWC's interests in the Work.

(c) Contractor's superintendent shall have full authority to act on behalf of Contractor and all communications, instructions, directions, and notices given to the superintendent by the Project Engineer shall be binding to the Contractor.

(d) Contractor's superintendent shall be responsible for coordination of the Work with other contractors or subcontractors. The superintendent shall not be replaced without written notice to PWC except under extraordinary circumstances.

(e) Subcontractors

(i) Contractor shall submit the names and references all Subcontractors to the Project Engineer for approval before commencing any Work.

1) In the event Contractor seeks to substitute any Subcontractor that was identified in Contractor's Bid, Contractor shall promptly provide PWC with: (1) the Subcontractor it seeks to substitute; (2) the identity of the Subcontractor to be substituted; and (3) the reason for the requested substitution.

2) PWC will review the requested substitution within five (5) Business Days and provide written approval or denial of the substitution, with such approval not to be unreasonably withheld.

(ii) Contractor's superintendent shall be available to be present at the Site at any time that any Subcontractor(s) is performing any of the Work. Construction activity shall be

stopped if the Contractor's superintendent is not available to be at the Site.

Section 7.02 Labor; Working Hours

(a) Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site. Contractor shall remove from the Project any person who appears incompetent, disorderly, or otherwise unsatisfactory. Contractor shall also remove any person who appears in PWC's sole discretion to be incompetent, disorderly, or otherwise unsatisfactory

(b) Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed on Business Days. Contractor will not perform Work on non-Business Days. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with PWC's written consent, which will not be unreasonably withheld. In such circumstances, Contractor shall submit a written request to PWC at least two (2) Business Days prior to any Work that it requests to complete on a non-Business Day and PWC will, in its sole discretion, approve or deny such request. If such work outside of a Business Day is approved, PWC will set forth the specific parameters that Contractor must follow, including time of work, personnel, and any other issues.8

Section 7.03 Services, Materials, and Equipment

(a) Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and Completion of the Project, whether or not such items are specifically called for in the Contract Documents.

(b) All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise specified in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of PWC. If required by PWC or its designee, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

(c) All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be specified in the Contract Documents.

Section 7.04 "Or Equals"

(a) Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Project Engineer authorize the use of other items of material or equipment under the circumstances described below.

(i) If Project Engineer determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Project Engineer shall deem it an "or equal" item and confirm such in writing to Contractor. A proposed item of material or equipment will be considered functionally equal to an item so named if:

1) in the exercise of reasonable judgment Project Engineer determines that:

a) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
b) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
c) it has a proven record of performance and availability of responsive service; and
d) it is not objectionable to PWC.

2) Contractor certifies that, if approved and incorporated into the Work:

a) there will be no increase in the Contract Price or Contract Times; and
b) it will conform substantially to the detailed requirements of the item specified in the Contract Documents.

(b) Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

(c) Project Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Project Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Project Engineer will be the sole judge of acceptability. Contractor shall not order, furnish, install, or utilize any "or-equal" it until Project Engineer has reviewed the request, determined that the proposed item is an "or-equal," and provided written confirmation to Contractor.

(d) Project Engineer's denial of an "or-equal" request shall be final and binding and may not be reversed through an appeal under any provision of the Contract Documents.

Section 7.05 Concerning Subcontractors, Suppliers, and Others

(a) Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to PWC.

(b) Contractor shall not subcontract more than forty-nine percent (49%) of the final Contract Price.

(c) Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract Documents.

(d) After the submittal of Contractor's Bid or final negotiation of the terms of the Agreement, PWC may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work.

(e) Prior to entry into any binding subcontract or purchase order, Contractor shall submit to PWC the identity of the proposed Subcontractor or Supplier (unless PWC has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process

or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to PWC unless PWC raises a substantive, reasonable objection within five (5) Business Days.

(f) No acceptance by PWC of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of PWC to the completion of the Work in accordance with the Contract Documents.

(g) Contractor shall be fully responsible to PWC for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

(h) Contractor shall be solely responsible for scheduling and coordinating the Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

(i) Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with PWC, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

(j) All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of PWC.

(k) PWC may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

(l) Nothing in the Contract Documents:

(i) shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between PWC or Design Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
(ii) shall create any obligation on the part of PWC or Design Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

Section 7.06 Patent Fees and Royalties

(a) Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device that is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of PWC, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by PWC in the Contract Documents.

Section 7.07 Permits

(a) Unless otherwise specified in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses necessary to achieve Completion of the Project. Contractor shall timely seek assistance from PWC if necessary to obtain any permits or

licenses; provided that, the Contract Time shall not be extended if PWC determines, in its discretion, that Contractor delayed or otherwise did not act expeditiously in requesting such assistance. PWC shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for Completion of the Project that are applicable at the time of the submission of Contractor's Bid.

Section 7.08 Taxes

(a) Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the applicable Laws and Regulations for the Project and which are applicable during the performance of the Work.

Section 7.09 Laws and Regulations

(a) Contractor shall give all notices required by, and shall comply with, all Laws and Regulations applicable to the Project. Except as otherwise expressly required, PWC shall not be responsible for monitoring Contractor's compliance with any Laws or Regulations.

(b) Contractor shall bear all resulting costs and losses for any of its actions or inactions that are contrary to Laws or Regulations.

(c) PWC or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under the Agreement) concerning any Laws or Regulations having an effect on the Contract Price or Contract Times, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If PWC and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 calendar days of such notice Contractor may submit a Change Proposal.

Section 7.10 Record Documents

(a) Contractor shall maintain in good order one (1) printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. These record documents, together with all approved Samples, will be available to Project Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to PWC.

Section 7.11 Safety and Protection

(a) Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

(i) all persons on the Site or who may be affected by the Work;
(ii) all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

(iii) other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

(b) Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss, and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify PWC, the owners of adjacent property or Underground Facilities, and other contractors and owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

(c) Contractor shall comply with the requirement of any of PWC's applicable health programs, which may be revised from time to time based on specific circumstances or applicable guidance from the Center for Disease Control or other applicable entity. Such health programs will be identified in the Special Conditions if applicable to the Project.

(d) Contractor shall comply with the requirements of PWC's applicable safety programs. The Special Conditions identify any of PWC's safety programs that are applicable to the Project.

(e) Contractor shall remedy, at its expense, all damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.

(f) Contractor's duties and responsibilities for safety and protection shall continue until such time as Completion of the Project is achieved.

(g) Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

(h) Contractor shall designate in writing to PWC a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

Section 7.12 Emergencies

(a) In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to, and shall, act to prevent threatened damage, injury, or loss. Contractor shall give PWC prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused or are required as a result of any emergency. If PWC determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

Section 7.13 Shop Drawings, Samples, and Other Submittals

(a) Contractor shall timely submit Shop Drawings and Samples required by the Contract

Documents to Project Engineer for review and approval in accordance with applicable specifications.

(b) Before submitting a Shop Drawing or Sample, Contractor shall have

(i) reviewed the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
(ii) verified all measurements, quantities, dimensions, performance and design criteria, installation requirements, materials, catalog numbers, and similar information;
(iii) verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
(iv) verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

(c) With each submittal, Contractor shall give Project Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to PWC for review and approval of each such variation.

(d) Where a Shop Drawing or Sample is required by the Contract Documents, any related Work performed prior to Project Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

(e) Project Engineer will provide timely review of any required Shop Drawings and Samples. Such review, and subsequent determination of approval, will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

(f) Project Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

(g) Project Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not change the Contract Times or Contract Price, unless such changes are included in a Change Order.

(h) Project Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall not result in such item becoming a Contract Document.

(i) Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples.

(j) Resubmittal Procedures:

(i) Contractor shall make corrections required by Project Engineer and shall return the

required number of corrected copies of Shop Drawings and submit new Samples as required for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by PWC or Project Engineer on previous submittals.

(ii) Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three (3) submittals. If PWC has engaged a Design Engineer for the Project, Design Engineer will record Design Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Design Engineer's charges to PWC for such time. PWC may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

(iii) If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Design Engineer's charges to PWC for its review time, and PWC may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

Section 7.14 Contractor's General Warranty and Guarantee

(a) In order to induce PWC to enter into an Agreement with Contractor for the Project, Contractor warrants and guarantees to PWC that:

(i) Contractor is duly licensed in the State of North Carolina to complete all Work necessary for the Project, is duly organized, validly existing and in good standing and has all requisite powers, rights, and authority to execute, enter into, and perform the Agreement in accordance with the terms and conditions of the Agreement, and the Agreement constitutes a legal, valid, and binding obligation of Contractor enforceable against it in accordance with its terms.

(ii) Contractor has read the Contract Documents, and acknowledges and understands all data, materials, specifications, and requirements identified in the Contract Documents.

(iii) Contractor has visited the site for the Project, conducted a thorough, visual examination of the site and adjacent areas, and become familiar with and is satisfied as to the general, local, and site conditions that may affect cost, progress, and performance in completing the Project.

(iv) Contractor is familiar with and is satisfied as to all laws and regulations that may affect cost, progress, and performance to complete the Project.

(v) Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the site and all drawings of physical conditions relating to existing surface or subsurface structures at the site that have been identified in the Detail Specifications and any accompanying reports and drawings, and (2) reports and drawings relating to any Hazardous Environmental Condition at or adjacent to the site that have been identified in the Contract Documents and any accompanying reports and drawings.

(vi) Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, if any, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

(vii) Based on the information and observations referred to in subsection "(v)" of this Section, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price and in accordance with the other terms and conditions of the Contract Documents.
(viii) Contractor is aware of the general nature of work to be performed by PWC and others at the Site that relates to the Work as indicated in the Contract Documents.
(ix) Contractor has given PWC written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by PWC is acceptable to Contractor.
(x) The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
(xi) Contractor's entry into this Agreement constitutes an incontrovertible representation by Contractor that, without exception, all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.
(xii) Contractor has no business or personal relationship with any PWC Commissioner, officer, director, manager, or supervisor and Contractor covenants to disclose immediately to PWC any such relationship that develops during the performance of Work on the Project.

(b) Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

(i) observations by Project Engineer;
(ii) recommendation by Project Engineer or payment by PWC of any progress or final payment;
(iii) the issuance of a certificate of Substantial Completion by Project Engineer or any payment related thereto by PWC;
(iv) use or occupancy of the Work or any part thereof by PWC;
(v) any review and approval of a Shop Drawing or Sample submittal;
(vi) the issuance of a notice of acceptability by Project Engineer;
(vii) any inspection, test, or approval by others; or
(viii) any correction of defective Work by PWC.

(c) If the Contract Documents requires the Contractor to accept the assignment of a contract entered into by PWC, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to PWC for the Work described in the assigned contract.

Section 7.15 Indemnification

(a) Contractor shall indemnify, defend, and hold harmless PWC and its Commissioners, officers, employees, agents, and representatives and the City and its elected officials, managers, employees, agents, and representatives and Designer (collectively "Indemnitees") from and against all claims, actions, liabilities, damages, losses, costs, and expenses (including, without limitation, injury to or death of any persons and damage to property, economic and consequential damages and attorneys' fees) asserted by one or more third parties against one or more of the Indemnitees if the Fault of one or more Responsible Persons is a proximate cause of the loss, damage, or expense indemnified.

(b) Contractor's obligation to indemnify, defend, and hold harmless the Indemnitees shall survive the termination of the Agreement.

(c) In any and all claims against the Indemnitees of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, Contractor's indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

Section 7.16 Claims Procedure

(a) PWC shall notify the Contractor of all potential claims related to the Work within seven (7) calendar days of receiving notification or having knowledge of such potential claim. Should the Contractor receive a potential claim related to the Work, the Contractor shall notify PWC within seven (7) calendar days of receiving notification. The Contractor shall provide the claimant and PWC with a written response acknowledging receipt of the claim within seven (7) calendar days.

(b) If the Contractor meets with the Claimant about the claim, a representative designated by PWC shall be present at all times. PWC shall maintain a record of any claim received, and the steps taken to resolve. PWC shall also concurrently investigate each case. The Contractor agrees to furnish PWC any information regarding the claim, the actions which led to the claim and/or the investigation of the claim. Contractor shall provide their proposed response to PWC within thirty (30) calendar days of receiving the claim. Upon receipt of the response PWC and the Contractor will discuss and reach a mutual agreement of the response necessary to send to the Claimant within fifteen (15) calendar days. Once the agreement is made the Contractor shall make a formal written resolution to the claimant.

(c) Failure to act in good faith or respond to a claim in the timelines established by the Contract Documents will constitute a lack of response by the Contractor, therefore validating the claim. PWC will deduct the total amount of the claim from the monthly pay application. Failure to comply with the above requirements for resolving claims may, at the sole discretion of PWC, result in breach of contract.

(d) The Contractor is aware of these claims procedures and understands that it is the PWC's practice to pursue reimbursement/subrogation for any and all claims related expenses, which are incurred as a result of the Contractor's performance under this Contract Documents and allowed within the applicable statute of limitations.

Section 7.17 Delegation of Professional Design Services

(a) Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

(b) If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, PWC will specify all performance and design criteria that such services must satisfy.

Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to PWC.

(c) PWC shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided PWC has specified to Contractor all performance and design criteria that such services must satisfy.

(d) Pursuant to this Section, PWC's, or its designee's, review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. PWC specifically retains final approval of such submittals.

(e) Contractor shall not be responsible for the adequacy of the performance or design criteria specified by PWC.

Article VIII. PWC's Responsibilities

(a) In awarding the bid to Contractor and executing the applicable Agreement, PWC acknowledges the following responsibilities:

(i) Except as otherwise provided in these General Conditions, PWC shall issue all communications directly to Contractor or its designee.
(ii) PWC may at its discretion replace Design Engineer and Project Engineer. The replacement Design Engineer or Project Engineer's status under the Contract Documents shall be that of the former Design Engineer or Project Engineer.
(iii) PWC shall promptly furnish the data required of PWC under the Contract Documents.
(iv) PWC shall make payments to Contractor when they are due as provided in the Contract Documents.
(v) PWC shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. PWC will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
(vi) Upon request of Contractor, PWC shall furnish to Contractor reasonable evidence that financial arrangements have been made to satisfy PWC's obligations under the Contract Documents (including obligations under proposed changes in the Work).
(vii) While at the Site, PWC's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which PWC has been informed.
(viii) PWC shall furnish copies of any applicable PWC safety program(s) to Contractor, which Contractor shall review and implement.

Article IX. Amending the Contract Documents; Changes in the Work

Section 9.01 Amending and Supplementing Contract Documents

(a) The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

(i) Change Orders: If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

(ii) Work Change Directives: A Work Change Directive will not change the Contract Price or the Contract Times, but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 9.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. PWC must submit any dispute or request seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

(iii) Field Orders: Project Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on PWC and on Contractor, which shall perform promptly the Work involved. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

Section 9.02 PWC-Authorized Changes in the Work

(a) Without invalidating the Agreement and without notice to any surety, PWC may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Design Engineer's recommendation when applicable and to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work as revised. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

Section 9.03 Unauthorized Changes in the Work

(a) Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented.

Section 9.04 Change of Contract Price

(a) The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of these General Conditions.

(b) An adjustment in the Contract Price will be determined as follows:

(i) where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved; or
(ii) where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit as agreed to in writing by the Parties); or
(iii) where the Work involved is not covered by unit prices contained in the Contract Documents and the Parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work plus a reasonable Contractor's fee for overhead and profit.

(c) Contractor's Fee: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

(i) a mutually acceptable fixed fee; or
(ii) if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

1) for unit prices, the Contractor's fee shall be fifteen percent (15%);
2) for all other costs incurred, the Contractor's fee shall be five percent (5%);
3) the amount of credit to be allowed by Contractor to PWC for any change that results in a net decrease in the Contract Price will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
4) when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change.

Section 9.05 Change of Contract Times

(a) The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 9.06.

(b) An adjustment of the Contract Times shall be subject to the limitations set forth in these Contract Document as it concerns delays in Contractor's progress.

Section 9.06 Change Proposals

(a) Contractor shall submit a Change Proposal to PWC to request an adjustment in the Contract Times and/or Contract Price. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

(i) Procedures: Contractor shall submit each Change Proposal to PWC promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in

Contract Price or Contract Time (if any), to PWC within 15 calendar days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

(ii) PWC Action: PWC will review each Change Proposal and, within 30 calendar days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing to Contractor. If PWC does not take action on the Change Proposal within 30 calendar days, then the Change Proposal is deemed denied, thereby commencing the time for appeal under these General Conditions.

(iii) Binding Decision: PWC's decision will be final and binding unless Contractor appeals the decision.

Section 9.07 Execution of Change Orders

(a) PWC and Contractor shall execute appropriate Change Orders covering:

(i) changes in the Contract Price or Contract Times that are agreed to by the parties, including any undisputed sum or amount of time for Work performed in accordance with a Work Change Directive;

(ii) changes in Contract Price resulting from a PWC set-off, unless Contractor has duly contested such set-off;

(iii) changes in the Work which are: (a) ordered by PWC, (b) required because of PWC's acceptance of defective Work or PWC's correction of defective Work, or (c) agreed to by the parties, subject to the need for Design Engineer's recommendation if the change in the Work involves the design (as set forth in the Contract Documents), or other engineering or technical matters; and

(iv) changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results.

(b) If PWC or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Section, it shall be deemed to be of full force and effect as if fully executed.

Section 9.08 Notification to Surety

(a) If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

Article X. Tests, Inspections, and Approvals; Correction, Removal, or Acceptance of Defective Work

Section 10.01 Access to Work

(a) PWC, Design Engineer, their consultants and other representatives and personnel of PWC, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing.

Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

Section 10.02 Tests, Inspections, and Approvals

(a) Contractor shall give Project Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

(b) PWC shall retain and pay for the initial services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by PWC, except those costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 10.05.

(c) If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish the required certificates of inspection or approval to PWC.

(d) Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

(i) by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to PWC;
(ii) to attain PWC's and Design Engineer's acceptance of materials or equipment to be incorporated in the Work;
(iii) by manufacturers of equipment furnished under the Contract Documents;
(iv) for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
(v) for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to PWC, as confirmed in writing by Project Engineer to Contractor.

(e) If the Contract Documents require the Work (or part thereof) to be approved by PWC or its designee, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

(f) If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Project Engineer, Contractor shall, if requested by Project Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given PWC timely notice of Contractor's intention to cover the same and PWC had not acted with reasonable promptness in response to such notice.

Section 10.03 Defective Work

(a) It is Contractor's obligation to assure that the Work is not defective.

(b) PWC or its designee has the authority to determine whether Work is defective, and to reject defective Work.

(c) Prompt notice of all defective Work of which PWC has actual knowledge will be given to Contractor.

(d) Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if PWC has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

(e) When correcting defective Work, Contractor shall take no action that would void or otherwise impair PWC's special warranty and guarantee, if any, on said Work.

(f) In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against PWC by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if PWC and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then PWC may impose a reasonable set-off against payments due.

Section 10.04 Acceptance of Defective Work

(a) If, instead of requiring correction or removal and replacement of defective Work, PWC prefers to accept it, PWC may do so (subject, if such acceptance occurs prior to final payment, to Design Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles and will not endanger public safety).

(b) Contractor shall pay all claims, costs, losses, and damages attributable to PWC's evaluation of and determination to accept such defective Work (such costs to be approved by PWC as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order.

(c) If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then PWC may impose a reasonable set-off against payments due. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to PWC.

Section 10.05 Uncovering Work

(a) PWC has discretion to require, at its initial cost, additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

(b) If any Work is covered contrary to the written request of PWC, then Contractor shall, if requested by PWC or its designee, uncover such Work for observation, and then replace

the covering, all at Contractor's expense.

(c) If PWC considers it necessary or advisable that covered Work be observed by PWC or inspected or tested by others, then Contractor, at PWC's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as PWC may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

(i) If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility PWC shall be entitled to impose a reasonable set-off against payments due.

(ii) If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 calendar days of the determination that the Work is not defective.

Section 10.06 PWC May Stop the Work

(a) If the Work is defective, or Contractor fails to supply sufficiently skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then PWC may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of PWC to stop the Work shall not give rise to any duty on the part of PWC to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

Section 10.07 PWC May Correct Defective Work

(a) If Contractor fails within the time specified by PWC in a written notice from PWC to correct defective Work, or to remove and replace rejected Work as required by PWC, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then PWC may, after seven (7) calendar days written notice to Contractor, correct or remedy any such deficiency.

(b) In exercising the rights and remedies under this Section, PWC shall proceed expeditiously. In connection with such corrective or remedial action, PWC may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which PWC has paid Contractor but which are stored elsewhere. Contractor shall allow PWC and its officers, employees, representatives, agents and other contractors, and Design Engineer and its employees and agents access to the Site to enable PWC to exercise the rights and remedies under this Section.

(c) All claims, costs, losses, and damages incurred or sustained by PWC in exercising the rights and remedies under this Section will be charged against Contractor as set-offs against payments due. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by

correction, removal, or replacement of Contractor's defective Work.

(d) Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by PWC of PWC's rights and remedies under this Section.

Article XI. Claims

Section 11.01 Claims Process

(a) The following disputes between PWC and Contractor shall be submitted to the Claims process set forth in this Article:

(i) Appeals by PWC or Contractor of Design Engineer's decisions regarding Change Proposals;
(ii) PWC or Contractor's demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
(iii) Disputes that Design Engineer has been unable to address because they do not involve the design (as set forth in the Contract Documents), the acceptability of the Work, or other engineering or technical matters.

Section 11.02 Submittal of Claim

(a) The party submitting a claim shall deliver it directly to the other party to the Agreement promptly (but in no event later than 30 calendar days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 calendar days of the decision under appeal. The responsibility to substantiate a claim shall rest with the party making the claim. In the case of a claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

Section 11.03 Review and Resolution

(a) The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party.

Section 11.04 Dispute Resolution

(a) In the event of any dispute, controversy, or claim of any kindor nature arising under or in connection with this Agreement (a "Dispute") and involving any two or more of the following parties, PWC, Design Engineer, Contractor or any subcontractor of Contractor, the party initiating the Dispute shall serve written notice of a Dispute on the party(ies) to the dispute, and those parties shall endeavor to settle the dispute first through direct, informal discussions between the parties' selected representatives. Any such representative(s) shall have binding authority to settle the Dispute. In the event the parties do not settle the Dispute within ten (10) calendar days from the date of written notice of the Dispute, any

party to the Dispute may, by written notice to the other party(ies), engage a mediator certified under the laws of the State of North Carolina to mediate the Dispute within thirty (30) calendar days of such notice. The parties to the Dispute shall attend mediation in good faith. In the event mediation is unsuccessful, any party to the dispute may initiate arbitration proceedings. Any controversy or claim arising out of or relating to the Contract Documents, or the breach thereof, shall be settled by binding arbitration administered by the American Arbitration Association under its Construction Industry Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof. All of the foregoing dispute resolution procedures shall be held in Cumberland County, North Carolina. The costs of the mediator and arbitrator in a dispute resolution process shall be divided equally among the parties to the process; provided, however, PWC shall bear at least one-third of the cost if PWC is a party to the dispute resolutionand the remainder of the cost shall be divided equally among the other parties participating in the dispute resolution. PWC shall, in its contractual arrangements with Design Engineer, and Contractor shall, in its contracts with Subcontractors and they in their contracts with lower-tier subcontractors authorize and direct such parties to participate in the dispute resolution procedures set forth in this Section. Unless otherwise directed in writing by PWC, Contractor shall continue the Project and maintain compliance with the scheduling deadlines set forth in theContract Documents during any dispute resolution proceedings. If Contractor continues to perform, PWC shall make payments due for the continued performance in accordance with this Agreement. The provisions of this Section shall not extend any applicable statutes of limitation or repose.

Article XII. Payments to Contractor; Set-Offs; Completion; Correction Period

Section 12.01 Progress Payments

(a) The Schedule of Values will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the Project Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period. Progress payments for cost-based Work will be based on the Cost of the Work completed by the Contractor during the pay period.

(b) Applications for Payments:

(i) Contractor shall submit to Project Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that PWC has received the materials and equipment free and clear, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect PWC's interest.

(ii) Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

(iii) The amount of retainage for progress payments will be as stipulated in the Contract

Documents.

(c) Review of Applications:

(i) Project Engineer will, within ten (10) Business Days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to PWC, or return the Application to Contractor indicating in writing Project Engineer's reason(s) for refusing to recommend payment. In the latter case, the Contractor may make the necessary corrections and resubmit the Application.

(ii) Project Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Project Engineer to PWC, based on Project Engineer's observations of the executed Work, and on Project Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Project Engineer's knowledge, information, and belief:

1) the Work has progressed to the point indicated;
2) the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work, and any other qualifications stated in the recommendation); and
3) the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Project Engineer's responsibility to observe the Work.

(iii) By recommending any such payment Project Engineer will not thereby be deemed to have represented that:

1) inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Project Engineer in the Contract Documents; or
2) there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by PWC or entitle PWC to withhold payment to Contractor.

(iv) Neither Project Engineer's review of Contractor's Work for the purposes of recommending payments nor Project Engineer's recommendation of any payment, including final payment, will impose responsibility on Project Engineer:

1) to supervise, direct, or control the Work, or
2) for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
3) for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
4) to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price.

(v) Project Engineer may refuse to recommend the whole or any part of any payment if, in Project Engineer's opinion, it would be incorrect to make the representations to PWC outlined in this Section.

(d) Project Engineer will recommend reductions in payment (set-offs) necessary in Project Engineer's opinion to protect PWC from loss because:

(i) the Work is defective, requiring correction or replacement;
(ii) the Contract Price has been reduced by Change Orders;
(iii) PWC has been required to correct defective Work or has accepted defective Work in accordance with these General Conditions;
(iv) PWC has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
(v) Project Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

(e) Payment Becomes Due:

(i) Twenty (20) Business Days after presentation of the Application for Payment to PWC with Project Engineer's recommendation, the amount recommended (subject to any PWC set offs) will become due, and when due will be paid by PWC to Contractor.

(f) Reductions in Payment by PWC:

(i) In addition to any reductions in payment (set-offs) recommended by Project Engineer, PWC is entitled to impose a set-off against payment based on any of the following:

1) PWC has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
2) Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
3) Contractor has failed to provide and maintain required bonds or insurance;
4) PWC has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
5) PWC has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
6) the Work is defective, requiring correction or replacement;
7) PWC has been required to correct defective Work or has accepted defective Work in accordance with the Contract Documents;
8) the Contract Price has been reduced by Change Orders;
9) an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
10) liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or Completion of the Project; or
11) there are other items entitling PWC to a set off against the amount recommended.

(ii) If PWC imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Project Engineer, PWC will give Contractor immediate written notice stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. PWC shall promptly pay Contractor the amount so withheld, or any adjustment agreed to by PWC and Contractor if Contractor remedies the reasons for

such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

(iii) Upon a subsequent determination that PWC's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due and subject to interest as provided in the Contract Documents.

Section 12.02 Substantial Completion

(a) When Contractor considers the entire Work ready for its intended use Contractor shall notify PWC and Design Engineer in writing that the entire Work is substantially complete and request that PWC acknowledge in writing that Contractor has met Substantial Completion.

(b) Promptly after Contractor's notification, PWC, Contractor, and Design Engineer shall make an inspection of the Work to determine the status of completion. If PWC does not consider the Work substantially complete, PWC will notify Contractor in writing giving the reasons therefor. PWC shall thereafter submit to Contractor an initial draft of punch list items to be completed or corrected before final payment.

(c) If Design Engineer considers the Work substantially complete, Design Engineer will deliver to PWC a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Design Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. PWC shall have seven (7) Business Days after receipt of the preliminary certificate to make written objection to Design Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, PWC concludes that the Work is not substantially complete, PWC will, within fourteen (14) calendar days after submission of the preliminary certificate to PWC, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor.

(d) At the time of receipt of the preliminary certificate of Substantial Completion, PWC and Contractor will confer regarding PWC's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by PWC. Unless PWC and Contractor agree otherwise in writing, PWC shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon PWC use or occupancy of the Work.

(e) After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment and shall complete such items within the time specified by PWC. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

(f) PWC shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

Section 12.03 Partial Use or Occupancy

(a) Prior to Substantial Completion of all the Work, PWC may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which PWC, Design Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by PWC for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

(i) At any time PWC may request in writing that Contractor permit PWC to use or occupy any such part of the Work that PWC believes to be substantially complete.
(ii) At any time Contractor may notify PWC and Design Engineer in writing that Contractor considers any such part of the Work substantially complete and request Design Engineer to issue a certificate of Substantial Completion for that part of the Work.
(iii) Within a reasonable time after either such request, PWC, Contractor, and Design Engineer shall make an inspection of that part of the Work to determine its status of completion. If Design Engineer does not consider that part of the Work to be substantially complete, Design Engineer will notify PWC and Contractor in writing giving the reasons therefor.
(iv) No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements regarding builder's risk or other property insurance.

Section 12.04 Final Inspection

(a) Upon written notice from Contractor that Completion of the Project has been achieved or an agreed portion thereof is complete, PWC will promptly make a final inspection with Project Engineer, Design Engineer, and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

Section 12.05 Final Payment

(a) Application for Payment:

(i) After Contractor has, in the opinion of PWC, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents, and other documents, Contractor may make application for final payment.
(ii) The final Application for Payment shall be accompanied (except as previously delivered) by:

1) all documentation called for in the Contract Documents;
2) consent of the surety, if any, to final payment;
3) satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to PWC free and clear or will so pass upon final payment;
4) a list of all disputes that Contractor believes are unsettled; anD
5) complete and legally effective releases or waivers (satisfactory to PWC) required by the Contract Documents.

(iii) If Design Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Design Engineer will, within ten (10) Business Days after receipt of the final Application for Payment, indicate in writing Design Engineer's recommendation of final payment and present the Application for Payment to PWC for payment. Such recommendation shall account for any set-offs against payment that are necessary in Design Engineer's opinion to protect PWC from loss for the reasons stated above with respect to progress payments. At the same time Design Engineer will also give written notice to PWC and Contractor that the Work is acceptable and that Completion of the Project has been achieved. Otherwise, Design Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

(iv) Within thirty (30) calendar days after the presentation to PWC of the final Application for Payment and accompanying documentation, the amount recommended by Design Engineer (less any further sum PWC is entitled to set off against Design Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by PWC to Contractor.

Section 12.06 Waiver of Claims

(a) The making of final payment will not constitute a waiver by PWC of claims or rights against Contractor. PWC expressly reserves claims and rights arising from defective Work appearing after final inspection, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from Contractor's indemnification obligations, or from Contractor's continuing obligations under the Contract Documents.

(b) The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against PWC other than those pending matters that have been duly submitted or appealed under the provisions of the Contract Documents.

Section 12.07 Correction Period

(a) If within one (1) year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to PWC and in accordance with PWC's written instructions:

(i) correct the defective repairs to the Site or such other adjacent areas;
(ii) correct such defective Work;
(iii) if the defective Work has been rejected by PWC, remove it from the Project and replace it with Work that is not defective, and
(iv) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

(b) If Contractor does not promptly comply with the terms of PWC's written instructions, or in an emergency where delay would cause serious risk of loss or damage, PWC may have

the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

(c) In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date only as provided in the Contract Documents.

(d) Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Article XII, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

(e) Contractor's obligations under this Article XII are in addition to all other obligations and warranties. The provisions of this Article XII shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

Article XIII. Suspension of Work and Termination

Section 13.01 PWC May Suspend Work

(a) At any time and without cause, PWC may suspend the Work or any portion thereof for a period of not more than 90 consecutive calendar days by written notice to Contractor and Design Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than thirty (30) calendar days after the date fixed for resumption of Work.

Section 13.02 PWC May Terminate for Cause

(a) The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

(i) Contractor's continued failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
(ii) Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
(iii) Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
(iv) Contractor's repeated disregard of the authority of PWC, Project Engineer, or Design Engineer.

(b) If one or more of the events identified in Paragraph 13.02(a) occurs, then after giving Contractor (and any surety) ten (10) calendar days written notice that PWC is considering a declaration that Contractor is in default and termination of the Agreement, PWC may proceed to:

(i) declare Contractor to be in default, and give Contractor (and any surety) notice that the

Contract is terminated; and

(ii) enforce the rights available to PWC under any applicable performance bond.

(c) Subject to the terms and operation of any applicable performance bond, if PWC has terminated the Contract for cause, PWC may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which PWC has paid Contractor but which are stored elsewhere, and complete the Work as PWC may deem expedient.

(d) PWC may not proceed with termination of the Contract under Paragraph 13.02(b) if Contractor within seven (7) calendar days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure and such efforts are agreed to by PWC.

(e) If PWC proceeds as provided in Paragraph 13.02(b), Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by PWC, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to PWC. Such claims, costs, losses, and damages incurred by PWC will be reviewed by PWC as to their reasonableness and, when so approved by PWC, incorporated in a Change Order.

(f) Where Contractor's services have been so terminated by PWC, the termination will not affect any rights or remedies of PWC against Contractor then existing or which may thereafter accrue, or any rights or remedies of PWC against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by PWC will not release Contractor from liability.

(g) The provisions of any applicable payment or performance bond shall govern over any inconsistent provisions of this Section.

Section 13.03 PWC May Terminate For Convenience

(a) Upon seven (7) calendar days written notice to Contractor, PWC may, without cause and without prejudice to any other right or remedy of PWC, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

(i) completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

(ii) expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

(iii) other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

(b) Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

Section 13.04 Contractor May Stop Work or Terminate

(a) If, through no act or fault of Contractor, (1) the Work is suspended for more than ninety (90) consecutive calendar days by PWC or under an order of court or other public authority or (2) PWC fails for sixty (60) calendar days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven (7) calendar days written notice to PWC, and provided PWC does not remedy such suspension or failure within that time, terminate the Contract and recover from PWC payment on the same terms as provided in this Article.
(b) In lieu of terminating the Contract and without prejudice to any other right or remedy, if PWC has failed for thirty (30) calendar days to pay Contractor any sum finally determined to be due, Contractor may, seven (7) calendar days after written notice to PWC, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

Section 13.05 Morality

(a) If, in the sole opinion of PWC, at any time Contractor or any of its owner(s) or employee(s) or agent(s) (each party, owner, employee, and agent is an "Actor") engages in any one or more actions that bring disrepute, contempt, scandal, or public ridicule to the Actor or subject the Actor to prosecution or offend the community or public morals or decency or denigrate individuals or groups in the community served by PWC or are scandalous or inconsistent with community standards or good citizenship or may adversely affect PWC's finances, public standing, image, or reputation or are embarrassing or offensive to PWC or may reflect unfavorably on PWC or are derogatory or offensive to one or more employee(s) or customer(s) of PWC, PWC may immediately upon written notice to Contractor terminate the Agreement, in addition to any other rights and remedies that PWC may have pursuant to the Contract Documents or at law or in equity.

Article XIV. Miscellaneous

Section 14.01 Additional General Terms and Conditions

(a) Contractor shall be subject to any additional terms and conditions for this Project as set forth in the applicable Appendices as specific in the Agreement, which is incorporated by reference as if set forth word-for-word herein.

Section 14.02 Giving Notice

(a) Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

(i) delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended;
(ii) delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice; or
(iii) sent to PWC or Contractor's designee(s) via email, with a confirmation of receipt.

Section 14.03 Computation of Times

(a) When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

Section 14.04 Cumulative Remedies

(a) The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

Section 14.05 Limitation of Damages

(a) With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither PWC nor Design Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

Section 14.06 No Waiver

(a) A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or any other provision of the Contract Documents.

Section 14.07 Survival of Obligations

(a) All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Agreement or termination of the services of Contractor.

Section 14.08 Controlling Law

(a) The Agreement shall be governed by the law of the State of North Carolina.

Section 14.09 Headings

(a) Article and paragraph headings, numbers, and letters are inserted for convenience only and do not constitute parts of these General Conditions.

PERFORMANCE BOND

Date of Execution: _____

Name of Principal: _____

(Contractor)

Name of Surety: _____

Name of Contracting Body: Fayetteville Public Works Commission, Fayetteville, N.C.

Amount of Bond: _____

PROJECT: P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT

KNOW ALL MEN BY THESE PRESENTS, That We, the Principal and Surety above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these present.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal entered into a certain Contract with the Contracting Body, identified as shown above and hereto attached.

NOW, THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term of said Contract and any extensions there of that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any Guaranty required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under the several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed, and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts.

Witness:	CONTRACTOR:
(Proprietorship of Partnership)	(Trade or Corporate Name)
By:	By:
Title:	Title:
(Corporate Secretary or Assistant Secretary, Only)	(Owner, Partner, Corporate President or Vice-President, Only) **(CORPORATE SEAL)**

Witness:	SURETY COMPANY:
	(Surety Company Name)
	By:
Countersigned:	Title:
(N.C. Licensed Resident Agent)	(Attorney in Fact) **(SURETY CORPORATE SEAL)**

PAYMENT BOND

Date of Execution: _____

Name of Principal: _____

(Contractor)

Name of Surety: _____

Name of Contracting Body: Fayetteville Public Works Commission, Fayetteville, N.C.

Amount of Bond: _____

PROJECT: **P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT**

KNOW ALL MEN BY THESE PRESENTS, that We, the PRINCIPAL and Surety above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal entered into a certain Contract with the Contracting Body, identified as shown above and hereto attached.

NOW THEREFORE, if the Principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under the several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed, and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts.

Witness:	CONTRACTOR:
(Proprietorship of Partnership)	(Trade or Corporate Name)
By:	By:
Title:	Title:
(Corporate Secretary or Assistant Secretary, Only)	(Owner, Partner, Corporate President or Vice-President, Only) **(CORPORATE SEAL)**

Witness:	SURETY COMPANY:
	(Surety Company Name)
	By:
Countersigned:	Title:
(N.C. Licensed Resident Agent)	(Attorney in Fact) **(SURETY CORPORATE SEAL)**

POWER OF ATTORNEY
(ATTACH)

CERTIFICATE(S) OF INSURANCE
(Attach)

NOTICE TO PROCEED

TO: _____ Date: _____

PROJECT: **P.O. HOFFER SUBSTATION INSTALLATION LABOR CONTRACT**

You are hereby notified to commence work in accordance with the Contract dated _____, 2024, on or before _____, 2024, and you are to complete the WORK within the **contract period** thereafter. The date of final completion therefore is _____.

FAYETTEVILLE PUBLIC WORKS COMMISSION

BY: _____

Victoria McAllister

Purchasing Manager

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED

is hereby acknowledged this the _____day of _____, 2024.

(CONTRACTOR)

BY: _____

TITLE: _____

- END OF SECTION –

SECTION C – TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

General Information
Scope of Work
Substation Construction Assembly Units
Removals and Disposals

PUBLIC WORKS COMMISSION OF THE
CITY OF FAYETTEVILLE, NORTH CAROLINA

INSTALLATION OF THE
PO HOFFER 69 X 25 X 15 KV SUBSTATION

TECHNICAL SPECIFICATIONS

1.0 General Information

1.1 The Drawings and Specifications are complementary, one to the other. That which is shown on the Drawings or called for in the Specifications shall be as binding as if both were called for and shown. The intention of the Drawings and Specifications is to include all labor, materials, transportation, equipment, and any other items necessary to do a complete job.

1.2 In such cases where the nature of the work requires clarification by the Engineer, such clarifications shall be furnished by the Engineer with reasonable promptness by means of written instructions or Detail Drawings, or both. Clarifications and Drawings shall be consistent with the intent of Contract Documents and shall become a part thereof.

1.3 All construction shall be performed in a workmanlike manner and shall conform to the Drawings and Specifications. The installation shall conform to the latest edition of specifications and publications from the following. The Contractor shall contact the Engineer for clarification / interpretation if there is a discrepancy between codes.

- *National Electrical Code* (NEC) and interim amendments,
- *National Electrical Safety Code* (NESC),
- *National Electrical Manufacturers Association* (NEMA),
- *North Carolina Building Code*,
- *Occupational Safety and Health Administration* (OSHA),
- *North Carolina Department of Labor, Division of Occupational Safety and Health* (OSHNC)
- *American National Standards Institute* (ANSI),
- *American Welding Society* (AWS),
- *American Society for Testing and Materials* (ASTM),
- *American Institute of Steel Construction* (AISC),
- *American Concrete Institute* (ACI),
- *Acoustical Society of America* (ASA),
- *Institute of Electrical and Electronics Engineers* (IEEE),
- *Concrete Reinforcing Steel Institut*e (CRSI) "Manual of Standard Practice," and
- *Underwriters Laboratories* (UL)

1.4 The Contractor shall install all of the major materials and equipment as listed as furnished by "Owner" or "others" and as required for the installation of the project and will furnish and install the miscellaneous materials and equipment listed elsewhere in this Specification and shown on the Drawings.

The Contractor shall also be responsible for transporting, off-loading and storage of the major materials and equipment furnished by the Owner or others that are currently stored at the Warehouse. The Contractor shall be responsible for receiving, off-loading and storage of any materials delivered to the site.

The Contractor shall provide a Material Person who is competent, organized and familiar with the material associated with this project. The Material Person will be responsible for arranging delivery, receiving, storing, disbursing and tracking all the material associated with this project. This person shall not be changed without prior approval of the Owner. This Material Person will be responsible for reporting material shortages and

misfabrications to the Owner, Engineer, and/or Supplier. The Material Person will work directly with the Owner, Engineer, and/or Supplier and will be the person on the project who is totally responsible for material.

A materials receipt shall be completed and signed by the Material Person within twenty-four (24) hours acknowledging receipt of the materials and equipment delivered. The Contractor shall distribute the completed material receipts as follows: one (1) copy shall be delivered to the Owner and one (1) copy retained by the Contractor.

The Contractor shall verify the quantity and condition of all materials delivered to him and in case there is any damage to or shortage of materials, he shall report same to the Owner and Engineer in writing, within twenty four (24) hours after delivery. If there is any shortage or damage which is sufficient to cause the materials to be unfit for use in the work, and the shortage or damage has not been reported as specified above, the Contractor will be charged with actual cost of replacement of such shortage or damage.

Damaged or defective materials and equipment, or waste of materials due to faulty handling or negligence during the course of installation or testing on the part of the Contractor shall be replaced, repaired, or charged against the Contractor at their actual cost to the Owner at the point of delivery to the Contractor, to the satisfaction of the Owner.

The Contractor shall furnish and install temporary traffic bollards around the power transformer and power circuit breakers once received and off-loaded onto foundations or in a storage location on-site to reduce the risk of the equipment being struck by a vehicle prior to the oil containment or structures being installed.

The Contractor shall provide temporary structures or heat, at his own expense, during construction for the proper storage of the materials and equipment furnished by the Owner to adequately house or protect them against deterioration or damage for whatever cause. Materials not adequately protected by the Contractor will be so protected by the Owner at the expense of the Contractor.

Upon completion of the work, the Contractor shall return to the Owner, at their storage areas, all materials and equipment furnished by the Owner and not used in the construction. Surplus materials and equipment thus returned shall be neatly stockpiled. The Contractor will be charged for any materials and equipment not used and not returned the amount equal to the cost of the materials and equipment to the Owner at point of delivery to the Contractor. Written receipts shall be made for returned materials, and one (1) copy shall be mailed to the Owner and one (1) copy retained by the Contractor.

1.5 The Contractor shall submit to the Engineer for approval a complete list of the miscellaneous materials and equipment he is required to furnish for the substation installation within thirty (30) days after the award of the Contract. The list of materials and equipment shall include, but not be limited to; concrete mix design, grounding materials, conduit materials, cable trench layout, control cables, electrical panel boards, etc., with specific supplier names, manufacturer names, catalog numbers and catalog data sheets. The Owner reserves the right to strict approval of proposed Contractor-furnished materials to insure system compatibility.

The Owner reserves the right to not allow the Contractor to begin work if the Contractor has not submitted the list of miscellaneous material and equipment. The additional time required to receive approval for the submittals will not extend the completion date of the project or negate the liquidated damages.

1.6 All Contractor-furnished material and equipment shall be new.

1.7 The Contractor shall submit to the Owner and Engineer a complete Bill of Material, after approval has been given for the Contractor-furnished materials, with an individual unit cost for each item. This is needed for the Owner's Continuing Property Records (CPR's) accounting system.

1.8 The Contractor shall submit to the Owner and Engineer for review, three (3) copies of catalog cut sheets, Shop or Setting Drawings and/or manufacturer product data or schedules for each item not on the approved Bill of Material within thirty (30) days after the award of the Contract, so as not to cause delay in the project.

1.9 The Contractor shall be responsible for laying out the work. The Contractor shall, immediately upon entering project site for purpose of beginning work, locate all general reference points and take such action as is necessary to prevent their destruction, lay out his own work, and be responsible for any error resulting from his failure to exercise such precaution. Corner stakes or center line stakes will be provided by the Owner for reference only, and the Contractor shall verify the locations prior to beginning work.

1.10 The Contractor shall provide and maintain the adequate number of temporary toilets recommended for the number of workmen on-site, through the completion of the project. Also, water service for construction, if required, shall be the responsibility of the Contractor.

Temporary power, if necessary, shall be supplied and connected by the Owner to operate tools, machinery, etc., during construction. The Owner will pay the monthly electric bill.

2.0 Scope of Work

The Contractor's work shall include the furnishing of all labor, tools and equipment, and materials, as outlined in Section 3.0, "Substation Construction Assembly Units" and the installation of those materials and the Owner-Furnished materials as indicated necessary to construct the subject station.

The following is a brief structural description of the station, geographic location, and an explanation of the basic Owner/Contractor responsibilities:

The PO HOFFER 69 x 25 x 15kV Substation includes:

a. One (1) 69kV A-frame line terminating structure
b. Six (6) 69 kV, 1200 A, hook-stick disconnect switches
c. Three (3) 48 kV MCOV lightning arresters
d. One (1) 69 kV, 1200 A, power circuit breaker
e. One (1) 69 kV rigid source bus with associated bus supports
f. Two (2) 69 kV, 3-phase, 1200 A, vertical break, manually-operated group switches with supports
g. One (1) 69 to 15kV power transformer
h. One (1) 25 kV six-bay distribution structure, with associated rigid bus, group-operated switches, disconnect switches, fuse-cuts, instrument transformers, lightning arresters, and power circuit breakers.
i. One (1) relay control house with associated relay protection panels and battery system
j. Six (6) underground circuit exits including corresponding manholes
k. Associated grounding system, static mast, oil containment system, conduit / cable trench system, and yard stone.

The geographic location of the PO HOFFER 69 x 25 x 15kV Substation is shown on the vicinity map located in the Appendices.

The Contractor's work will be near and/or in the vicinity of energized electrical equipment and is more fully described in the plans, specifications, and Contractor's proposal for work in these locations, the contractor must provide personnel qualified to work near and on energized equipment, bus work and lines. All such work shall be performed to meet at least the safety rules and regulations prescribed by the Owner for its employees including the use of rubber gloves, hot sticks and associated protective equipment. A copy of such rules and regulations may be examined at the office of the Owner. The Owner will perform or have performed any required power line switching.

2.1 Owner Responsibilities

Work that will be performed by the Owner or others and is not included in this Contract for the substation includes the following:

2.1.1 Furnishing the 69 kV to 15 kV power transformer,

2.1.2 Furnishing the one (1) 1200 A 69kV breakers,

2.1.3 Furnishing the six (6) 1250 A 25 kV breakers,

2.1.4 Removing existing breakers (disconnected by Contractor),

2.1.5 Removing existing transformer (disconnected by Contractor),

2.1.6 Furnishing one (1) station service transformer,

2.1.7 Installation of the 69 kV transmission line to the line terminating structure at the substation,

2.1.8 Installation of circuit exit feeder cables,

2.1.9 Installation of fiber optic cable from street to control house,

2.1.10 Installation of backup auxiliary power to transfer switch

2.1.11 Furnish Control House with battery charger and relay panels

2.1.12 Furnish three (3) manholes to be installed by Contractor

2.2 Contractor Responsibilities

2.2.1 Removal of existing structures and equipment foundations and conduit as outlined in Section 4.0 – Removal and Disposal,

2.2.2 Removal of existing trees and shrubs as shown on drawings,

2.2.3 The installation of the Structures and Equipment package found in the appendix,

2.2.4 The installation of the Control House,

2.2.5 Installation of circuit exit conduit and new manholes,

2.2.6 The furnishing and installation of manhole sump pumps and drains,

2.2.7 The installation of the Owner furnished batteries,

2.2.8 Furnishing and installation of other material and equipment shown in Section 2.3, “Contractor-Furnished Materials,”

2.2.9 Installation of fiber optic patch panels in the breaker cabinets and SCADA panel. Install and connect fiber optic cables from the fiber patch panel housing inside breaker cabinets at the yard to the fiber patch panel on the SCADA switchboard at the control building.

2.3 Contractor-Furnished Materials

The Contractor shall furnish and install all of the miscellaneous material and equipment as required and described in each group of the “Substation Construction Assembly Units” for the complete installation of the project.

The miscellaneous material and equipment to be furnished and installed by the Contractor shall be the following, unless otherwise noted, but are not limited to:

a) Reinforced concrete foundations,
b) Conduit and cable trench system,
c) Lighting,
d) Control wiring system,
e) Oil containment system,

f) Grounding grid
g) Yard stone
h) Sump pumps and drains, and
i) Fencing system.

2.4 Project Change Orders

The Owner, without invalidating the contract, may order changes in the scope of work of the contract, consisting of additions, deletions, or other revisions with the contract amount and completion time, being adjusted accordingly. All such changes in construction shall be authorized by a change order as outlined in Contract Section. No changes in work shall begin without prior written approval by the Owner.

3.0 Substation Construction Assembly Units

3.1 Structures

3.1.1 Structural Steel Installation

The Contractor shall be responsible for off-load, storage, and installation of the structural steel.

The PO HOFFER 69 x 25 x 15kV Substation includes:

a. One (1) 69kV A-frame line terminating structure
b. Two (2) 69 kV GOAB switch supports
c. Three (3) 69 kV single-phase low bus supports
d. One (1) 69 kV three-phase high bus supports
e. One (1) 25 kV six-bay distribution structure
f. Six (6) 25 kV underground riser structures, and
g. One (1) 85-foot direct buried static pole with 10'-0" static mast.

The structural steel weight is approximately 57,000 pounds.

All steel structures shall be plumb and level. Structural bolts shall not be tightened until all parts are installed in place. After steel is completely installed, bolts shall then be installed to final torque levels. Care shall be exercised to prevent kinking of steel members. Base plates for columns shall be leveled and installed using the double-nut method unless noted.

All structural steel and anchor bolts are hot-dipped galvanized. All steel surfaces or finish damage damaged during the material handling, installation or removal of various equipment shall be thoroughly cleaned, brushed and cold galvanized applied with Galvanox or approval equal.

The Contractor shall take the necessary measures required to prevent any foreign material, such as mud, dirt, concrete splatter, etc., from accumulating on the stored materials. These measures shall include, but shall not be limited to, the use of timbers/pallets to elevate material above grade, covering an area of the initially graded substation yard with several inches of washed stone, the use of a storage trailer, or an enclosed structure.

The structural steel and cast steel shall conform to ASTM Specifications A-36 and A-27 respectively. Wrought iron shall conform to ASTM Specifications A-41 for bolts, rods and bars, A-42 for plates, and A-162 for sheets. Cast iron shall conform to Federal Specifications QQ-I-652. Gauges of sheet iron and steel, as specified, are U.S. Standard for Sheet and Plate. Gauges of nonferrous metals are Brown and Sharpe.

3.1.2 Substation Bus and Leads

The bus and leads installed by the Contractor shall utilize weldment type rigid bus connectors, bolted type terminal lead connectors, and compression type terminal lead connectors which shall be off-loaded at site, stored and installed by the Contractor and include the following: 69 kV and 25 kV rigid bus work, 69 kV leads from the rigid bus work to the disconnect switches, 69 kV leads to the power circuit breaker, 69 kV and 25 kV leads from the power transformer bushings and lightning arresters to both the rigid bus work and GOAB switch, 25 kV leads from rigid bus work to the disconnect switches and power circuit breakers, and 25 kV leads from rigid bus work to the fuse-cut, instrument transformers, and the station service transformer.

The rigid bus and leads shall be installed in sizes and locations as indicated on the Drawings. Aluminum shall conform to Federal Specifications and shall be Alloy 6063T6, anodized. All conductor terminal connections shall be dry brushed, and then wet brushed with a suitable electrical joint compound applied when connections are made to prevent oxidation. Bolted connections shall utilize Anderson Type VS non-gritted compound, and compression connections shall utilize Anderson Type VSG gritted compound. All bus and lead connections shall be electrically sound. All compression tools shall utilize dies approved by the connector manufacturer and shall utilize a minimum sixty (60) ton compression. All bolted electrical connections will utilize stainless steel bolts, washers, and nuts. Connectors shall have all bolts tightened to torque levels specified by the connector manufacturer or the Engineer. New connectors shall be used in all cases of new or relocated connectors. Bi-metallic transition plates, 2-hole or 4-hole shall be used on all copper to aluminum connections.

The Contractor shall install single conductor of 336.4 kcmil ACSR inside the aluminum bus tubing in excess of twenty feet (20') in length as a dampening device. All aluminum tubing shall have one (1) 1/4–inch diameter weep holes drilled in mid-span of bus supports, end bus fittings and in locations as indicated on the Detail Drawings.

The Contractor shall utilize one of the two (2) accepted methods of welding aluminum bus work: Tungsten Inert Gas (TIG) or Metal Inert Gas (MIG). Flux shall not be used in welding aluminum. Speed of welding shall be such that expansion and contraction is held to a minimum. All fillets shall be by the two-pass method.

Moisture shall not be allowed to contaminate the shielding gas, as this will create porosity in the weld during the initial weld period. All welded connections on aluminum bus or structural elements shall be made by personnel holding a current certification from AWS. Safe welding practice shall always be observed as outlined in "Aluminum Welders Training Manual, First Edition, January 1972" or other County, State or Federal Safety Practices. Welding shall not be attempted during rain, snow, fog, or windy conditions, unless area of welding is protected by an appropriate covering.

All materials to be welded shall be thoroughly cleaned with a mild alkaline, alcohol or acetone solution and commercial degreasers that do not evolve toxic fumes during welding. All welding surfaces must be dried after cleaning before welding to prevent porosity in the welded surface. Oxide films must be removed from the surface of the aluminum by a suitable abrading process and brushing with a clean stainless steel wire brush immediately prior to welding. The filler wire for 6063 alloy bus tubing shall be filler alloy #5356 and shall be kept clean.

Voltage, current and gas flow must be correct to make proper welds and for given situations. MIG welding is done with a direct current, reverse polarity. Shielding

gas for MIG welding shall be argon, helium or a mixture of the two gases. The two main types of DC power sources for MIG welding are Constant Current (Dropping Characteristic) Unit and Constant Voltage (Constant Potential) Unit. Current Settings and Gas Coverage are in Tables 4 to 7 in Welders Training Manual, "The Aluminum Association, First Edition 1972".

AC current will be used with TIG method of welding. Shielding gas for TIG welding shall be argon. If a water supply is not available, a small water tank and pump will be used to recirculate water from the tank to torch and return. Anti-freeze will be added if conditions warrant, and soluble oil is added to water circulating units. The electrode will extend beyond the gas cup slightly further than its diameter for fillet welding. The proper size electrode will be chosen for the proper weld to prevent poor welds. In starting a TIG weld the tungsten electrode shall not touch the aluminum work piece. The filler rod or wire shall always be placed within the inert gas shield and at the leading edges of the weld pool. The proper size rod or wire will always be used.

3.1.3 Animal Guards

The animal guards shall be installed by the Contractor. A list of the animal guards is located in the Bill of Materials. Type BISG guards shall go on all low-side bus insulators, switch insulators, and arresters with the exception of the transformer arresters. Type BCAC guards shall go on low-side breaker bushings, as well as low-side transformer bushings and arresters.

3.2 Three-Pole Group Operated Air Break Switches

The 69 kV, and 25 kV manually operated, three-pole group operated air-break switches to be installed by the Contractor. The Contractor shall be responsible for off-loading, storage, proper assembly, installation, and adjustment of the group-operated air break disconnect switches.

3.3 Lightning Arresters

The station class Type PVN polymer lightning arresters for each substation shall be furnished by the Owner. The Contractor is only responsible for installing the A Frame arrestors, and for installing the #2 AWG ground wire for the feeder exit arresters. The installed #2 AWG ground wire for the feeder exit arresters shall be left coiled up at the foot of the associated structures. The Contractor shall receive and store in the Control House the feeder exit arrestors. The feeder exit arrestors will be installed by Owner.

3.4 Single-Pole Disconnecting Switches

The 69 kV hooksticks, 25 kV hooksticks and 25 kV fused cutout single-pole disconnect switches for each substation shall be installed by the Contractor.

3.5 Circuit Breakers

The 69 kV and 25 kV power circuit breakers for the substation will be furnished by the Owner and stored at the Owner’s warehouse. The Contractor shall be responsible for hauling from the Owner’s warehouse to the project site, off-loading, storage, proper assembly and installation. The Owner will be responsible for the control settings and operation of the breakers.

3.6 Circuit Reclosers – NOT REQUIRED

3.7 Instrument Transformers

The three (3) voltage transformers for the substation will be installed by the Contractor.

3.8 Transformers

Power Transformers

The power transformer will be furnished by the Owner and delivered to the pad at the station. The final assembly, dress-out, oil-filling, and manufacturer testing will be performed by the Owner. The Contractor shall install the electrical connections for the high-voltage, low-voltage bushings, lightning arresters, control wires, AC and DC power wires, and ground leads for the transformer at the project site.

Station Service Transformer

The Owner will furnish, and the Contractor shall install one (1) 25 kVA station service transformer at the substation, all in accordance with the Drawings.

3.9 Voltage Regulators - NOT REQUIRED

3.10 Communications and Supervisory Control Panel

The SCADA cabinet will be furnished and installed by the Owner. Control building for the station will have one (1) SCADA cabinet. All power cables, control cables, fiber optic cables, and fiber patch panels from the yard to the cabinet in the control house shall be furnished, installed, and terminated by the Contractor according to the Cable Schedule.

3.11 Conduit and Cable

3.11.1 Conduit

Non-Metallic Conduit - Non-Encased

The Contractor shall furnish and install rigid non-metallic, polyvinyl chloride (PVC), Schedule 40, conduit for all below ground and above ground conduit runs in the sizes and to the locations as shown on the Drawings, complete with appropriate pull strings.

The Contractor shall begin the conduit installation from the precast concrete cable trench to the appropriate equipment enclosure locations and junction boxes per the Plans and Details. The Contractor shall furnish and install the rigid non-metallic, polyvinyl chloride (PVC) single gang switch / junction boxes for the outdoor lights and outdoor receptacles in locations as shown on the Drawings and Details.

The Contractor shall install all conduits to the junction boxes and/or to the equipment cabinets and install pull-strings in preparation for pulling control cable. The conduit system shall be installed in the straightest path possible and with the minimum amount of bends in any given conduit run. The installation shall avoid sharp radius bends in any one conduit run. The minimum radius bend shall be per the manufacturer's recommendations.

In the event the use of rigid conduit is not as well suited for the installation into the equipment control cabinet, it may be necessary to use non-metallic flexible liquid-tight conduit. The Contractor shall contact the Owner prior to using in cases such as cabinets for the power transformers or power circuit breakers. The Contractor shall be prepared to furnish and install the rigid and/or flexible conduit and be responsible for the required necessary fittings.

The conduit system installation shall be complete with adapters, fittings, elbows, sweeps, flexible liquid-tight fittings, bushings, locknuts, and weatherheads, as required and as shown on the Detail Drawings for a complete installation. Conduits shall be cleaned, installed, and joined using the appropriate PVC cleaner and solvent cement, as recommended by the Manufacturer, at all fittings and joints in the layouts.

The below-ground conduit system for control cable installations shall be buried two feet (2'-0") below final grade, excluding yard stone cover.

The Contractor shall exercise necessary precautions to prevent the accumulation of water, dirt, or concrete in the conduits during execution of the work. Conduits that have been deformed or crushed in any way shall not be installed. Conduits in which water or other foreign materials have been permitted to accumulate shall be cleaned thoroughly or the conduit run replaced where such accumulation cannot be removed by methods approved by the Owner.

Trenches shall be of necessary width for the proper laying of the conduits and the trench banks shall be as nearly vertical as practicable. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of conduit on undisturbed soil at every point along its entire length. Care shall be taken not to excavate below the depth indicated. Unauthorized overdepth shall be backfilled with loose, granular, moist earth, thoroughly tamped. Whenever wet or otherwise unstable soil is encountered that is incapable of properly supporting the conduit (as determined by the Owner) such soil shall be removed to the depth required and the trench backfilled to the proper grade with coarse sand, fine gravel, or other suitable material, as hereinafter specified.

In the event trenching excavations are in excess of five feet (5') in depth, the trench shall include shoring or slope-cutting of vertical walls in accordance with OSHA regulations.

Electrical Metallic Tubing

The Contractor shall furnish and install the electrical metallic tubing (EMT) in sizes shown on the Drawings and Details to be used in the control buildings. The Contractor shall be responsible for the conduit runs from the battery chargers to the cable tray and into the battery room. The EMT conduit installation shall include all required material such as connectors, couplings, nipple fittings, conduit straps, adapters and bushings.

Cable Trench

Synertech Plastibeton Channel System, or approved equal, shall be furnished and installed by the Contractor in accordance with the Plans and Specifications. Channel shall be traffic rated. The channel shall be installed on level and even surfaces set at 2" below final grade level on a surface of crushed stone complete with two (2) four inch (4") drainpipes to keep the trench dry. Channel system installation specifications are on Oldcastle website at

http://www.oldcastleprecast.com/plants/Enclosures/brands/Pages/synertech.aspx/products_p_inst.html

All cable trench systems shall be furnished with a minimum of two lifting hooks for each 100' of trench or portion thereof.

Junction Boxes

The junction boxes shall be furnished and installed by the Contractor. The junction boxes for the project shall be rated NEMA 3R weatherproof, and shall include terminal blocks, cartridge fuses, mounting panel, and power connectors, as shown on the Drawings. Junction boxes shall be Hoffman Engineering Company enclosures with inner mounting panel, or equal, at the minimum dimensions, as shown on the Drawings.

Lighting

Exterior yard lighting for each substation shall be furnished and installed by the Contractor as shown on the Drawings and Details. Steel structure mounted lighting shall be standard, two-lamp fixtures. Each exterior structure-mounted light shall be controlled from the ac panel board circuit breaker inside each control building and a weatherproof simple switch where shown on the drawings.

Safety Switches

The Contractor shall furnish and install one (1) safety switch at the substation for the station service transformer as shown on the Drawings and Details. The safety switch shall be rated 200A NEMA 3R, heavy duty, include fuses, and shall be Square D Company Catalog No. H224NRB, or approved equal.

The Contractor will install a meter socket, supply by Owner, between the safety switch and the station service transformer as shown on the Drawings and Details.

3.11.2 Cables

The Contractor shall submit qualifications for the electricians performing the installation and termination of the power and control wiring for the project to the Engineer for approval, upon award of Contract.

All power and control cables shall be clearly and permanently marked at each termination of the jacket in accordance with the cable numbers shown on the "Cable Schedule". Each conductor shall be clearly and permanently marked at each termination. Each cable and each individual conductor shall be labeled using Brady "I.D. Pro Plus" Type wire marking sleeve or approved equal. Conductor markings shall be in accordance with the Drawings. The markers shall indicate on each end the device identification and device terminal numbers shown on the Drawings to be issued to the Contractor. The wire markers shall indicate the destination of the wire, not the origin. For example, the wire end terminated on Device 50/51 Terminal 2, whose other end is on Device 87T Terminal 2, shall be labeled 87T-2. Wiring shall be done in an orderly manner to permit the addition of Owner's wiring and for troubleshooting wire tracing. The cable jacket shall remain on the cable to a point within one foot (1') of where the first conductor is terminated. At the termination of the jacket, the cable shall be securely sealed using plastic electrical tape. The cables shall be neatly bundled together and secured to the panel/cabinet using plastic cable ty-wraps.

All power and control wiring shall be continuous from terminal point to terminal point; no splices will be permitted. Terminations shall be made using insulated ring tongue compression connectors, AMP PIDG; spade-type terminals shall not be used. All control wiring shall be neatly dressed and tied using plastic cable ty-wraps, in each device. Terminations, wire markers, electrical tape, and ty-wraps shall be furnished by the Contractor. The Contractor is to terminate all power and control wiring unless indicated to be by Others. All control and power cables shall have at least one loop of spare wire in bottom of compartment and / or be long enough to reach any terminal in compartment.

Power Cable

Station service and power cables shall be furnished, installed, and terminated by the Contractor. A list of power cable types, with suggested manufacturers and catalog numbers is included in the Appendices.

Control Cable

Control cables shall be furnished, installed, and terminated by the Contractor. A list of control cable types, with suggested manufacturers and catalog numbers is included in the Appendices.

3.11.3 Pre-terminated Fiber Optic Cable

3.11.3.1 General

Fiber Optic Cable assemblies pre-terminated at the factory will be furnished and installed by the Contractor.

Contractor responsibility is to measure conduit, trench, tray and entry to patch panels for each run, apply additions to length as documented, submit quote request to Anixter and order each cable under separate part number from Anixter/CompuLink and install each cable as directed in prints and schedules.

The Prints and Schedules make some allowance for additional slack in case measurements are short, contractor must understand limitations of those provisions and is still responsible for ordering cable long enough to reach as needed and maintain fiber optic cable requirements for minimum bend radius. The Contractor should consult and use Prints and Schedules to understand installation requirements and ensure proper length ordered. Wireman must obtain fiber cable pulling specifications well ahead of installation. Wireman must know Minimum Bend Radius (MBR) for the cable both during pull and when cable in place, MBR during pull is LARGER than that when cable is resting in place. Wireman must know Maximum Pull Tension for the cable both during pull and when cable in place, Maximum Pull Tension during pull is LARGER than that when cable is in place. Wireman must be familiar with Radius Guides, Rollers, Pulleys and tension measurement equipment before performing install.

After pulling in Pre-Terminated Cables, Wireman must land pre-terminated cable connectors in these Yard Cabinet (breaker cabinets, transformer cabinet) patch panels and also in Control House SCADA switchboard fiber patch panels per prints. Persons doing this work must be familiar with fiber connectors and their installation

3.11.3.2 Determining Length of Each Cable Run

The Cable and Conduit Schedule indicates which Cable Numbers are Fiber Pre-terminated (FIBER-PT) Assemblies and also indicates the Source and Destination information. This Schedule provides a table to help determine length to order. This table may be copied as needed to provide space to record actual measurements and determine order length. Three additions to the cable length beyond that measured are provided in the table: In-Cabinet Length, Turn Loop Length and Just-In-Case Length.

3.11.3.3 Installation

Wireman must obtain fiber cable pulling specifications well ahead of installation. The Minimum Bend Radius (MBR) is 4.3” for all fiber optic cable during pull, MBR during pull is LARGER than that when cable is resting in place. The Minimum Bend Radius (MBR) is 3” for all fiber optic cable in place. Wireman must know Maximum Pull Tension for the cable both during pull and when cable in place, Maximum Pull Tension during pull is 300 LBF. Wireman must be familiar with Radius Guides, Rollers, Pulleys and tension measurement equipment before performing install.

3.12 Foundations

3.12.1 General

The Contractor shall furnish and install the reinforced concrete foundations as shown on the drawings and attached specification, complete with excavation, off-site disposal of excavated spoils, grading, backfilling, and compaction of all excavations to restore existing grade levels, foundation layout, concrete, rebar, tie wire, and forming materials.

The reinforced concrete foundations, footings, piers and pads shall be installed as indicated on the Drawings, and to undisturbed earth. Dimensions indicated for anchor bolt settings shall be checked against the manufacturer's erection drawings, structural steel and/or equipment to be installed prior to the construction of the formwork.

3.13 Site Preparation

Yard Stone

Once all below-grade construction activity for each phase of the construction as described by this Specification is completed, the Contractor shall proceed with final grading, compaction, clean-up, and the addition and compaction of the yard stone to the substation areas as shown on the drawings. The Contractor shall furnish and install three inches (3") of No. 57 washed stone on top of three inches (3") of compacted No. ABC "crusher-run" stone fill to a total depth of six inches (6") over each substation area as indicated on the Grading and Erosion Control Drawings (GR1 of 2). The Contractor shall use a vibratory roller to compact the layer of the "crusher-run" stone prior to placement of No. 57 stone. The vibratory roller shall also be used to compact the No. 57 stone after final installation. The finished grade contours of the substation site shall be maintained after the crusher run stone has been installed. All areas disturbed by excavation beyond this stone base will also be seeded by the Contractor.

Yard, trench and general backfilling is required to return the disturbed areas to the previous finish grade prior to the construction. This shall constitute grading to the elevations shown on the drawings, allowing an average of 2% of grade with the natural slope of the ground for drainage. The area shall be brought to a smooth compacted plane in such a manner that there will be no pockets or depressions which will hold water, and so that the area will drain naturally. The trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand and gravel, soft shale, or other approved materials, free from large clods of earth or stones, deposited in six-inch (6") layers and thoroughly and carefully tamped until the conduit or cable has a minimum cover of one foot (1'). The remainder of the backfill material shall then be placed in the trench in one-foot (1') layers and tamped. Any trenches improperly backfilled, or where settlement occurs, shall be reopened to the depth required for proper compaction, then refilled and compacted, with the surface restored to the required grade and compaction as specified. Open trenches in roadways or other areas subject to traffic shall be backfilled in six-inch (6") layers, and each layer shall be moistened and compacted to a density at least equal to that of the surrounding earth and in such manner as to permit the rolling and compaction of the filled trench with the adjoining earth to provide the required bearing value. Finish grade areas shall be raked clean and free from all trash, wood, forms, and other debris after completion of work, and all spoil piles shall be leveled, and excess materials disposed of. If any spoils materials appear to have contamination, contractor is to seek guidance from Owner or Owner's Engineer. Otherwise, dispose of spoils at a NCDENR approved location.

Where backfill is required only clean excavated materials shall be used. If the original excavated materials are soft, spongy, or otherwise unsuitable for backfill, suitable materials shall be brought in and used. Backfill shall be placed in horizontal layers not in excess of twelve inches (12") in thickness, and thoroughly compacted. Backfill shall be compacted to a minimum of ninety-five percent (95%) Modified Proctor Density.

3.14 Fence

Fences and Gates

The existing fence will remain. The Owner will furnish and install all signs to be installed on the fence. The Owner will furnish padlocks for all gates.

The Contractor shall furnish and install any temporary fencing needed to maintain a safe and secure site and to completely isolate any construction activity from any energized device or structure. Fence posts should be coated with epoxy.

The chain-link fence and gates will have grey privacy slats installed throughout. The non-conductive fence shall be Shakespeare SafeFence or approved equal. www.skp-cs.com/products/safefence.

3.15 Station Grounding

The below-grade grounding systems including all Cadweld Connectors shall be furnished and installed by the Contractor. The station ground bus and perimeter fence ground bus is buried two feet six inches (2'-6") below subgrade, excluding final yard stone cover. Trenches shall be of necessary width for the proper laying of ground conductors and the trench banks shall be as nearly vertical as practicable. The perimeter fence ground bus is installed four feet (4') beyond the fence.

The grounding conductors and interconnections shall be installed by the Contractor as indicated on the Drawings. The grounding conductor shall be 2/0 and 4/0 AWG bare copper, 2/0 AWG copper clad steel, and No. 2 AWG tinned copper used in locations as shown on the drawings. The Contractor shall install all ground grid leads for the power circuit breakers, neutral bushings of the power transformers and lightning arrester equipment connections with one continuous ground wire from the grid. All below grade grounding conductor interconnections shall be exothermically welded electrical connection type, as indicated on the Drawings. The connections will be the Erico, Inc. "Cadweld" Type. Cadweld certification is required per the "Certifications" section of this Contract.

All grounding connections that are only present above grade shall be 2/0 AWG 40 percent conductivity copper clad steel. Copper clad shall NOT be installed as part of the below grade grid, or as a pigtail connection to the below grade grid.

The trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand and gravel, soft shale, or other approved materials, free from large clods of earth or stones, deposited in six-inch (6") layers and thoroughly and carefully tamped until the cable has a minimum cover of one foot (1'). The remainder of the backfill material shall then be placed into the trench in one foot (1') layers and tamped. Any trenches improperly backfilled, or where settlement occurs, shall be reopened to the depth required for proper compaction, then refilled and compacted, with the surface restored to the required grade and compaction as specified. Open trenches in roadways or other areas subject to traffic shall be backfilled in six-inch (6") layers, and each layer shall be moistened and compacted to a density at least equal to that of the surrounding earth and in such manner as to permit the rolling and compaction of the filled trench with the adjoining earth to provide the required bearing value.

Station Grounding Tests

The Contractor shall perform grounding tests for the ground grid system in accordance with the latest revision of ANSI/IEEE 80 and 81 to certify resistance values shown on the Drawings. Tests shall be performed in the presence of the Owner or the Owner's Engineer and on the form Ground System Test located in the Appendices. The preferred test method to be used is the three-point fall of potential method. The substation grounding system shall also be tested for continuity. The Contractor shall notify the Owner one week in advance of scheduled tests. The continuity and resistance test results shall be recorded and certified by the Owner.

Certifications

The Contractor shall have worker certification for all personnel installing exothermically welded connections. Training and certification is provided free of charge by Erico Electrical Products. Call 1-800-248-WELD or Dan Mays at 919-812-1043 or at his e-mail address, dmays@erico.com.

3.16 Buildings

The Owner shall furnish and install one (1) control building at the substation. The control building is a pre-fabricated concrete building, complete with pre-wired electrical panels, lights, switches, receptacles, cable tray, cable tray risers, and ventilation systems. The Contractor shall be responsible for the proper installation of the outdoor cable tray risers, so that after the cable trench installation along the building, a proper fit between the riser and trench is obtained.

3.17 Batteries

The Contractor shall also be responsible for receiving, off-loading, storage and installing the Owner-furnished battery systems per manufacturer's directions which include the rack, and batteries. This installation shall be complete to ensure all necessary conduit, conduit straps, adapters, bushings, bolts, anchors, etc. for a completed system.

3.18 Oil Containment System

The oil containment system shall be furnished and installed by the Contractor for the power transformer in accordance with the Specifications and Bill of Materials as found in the Appendices, and the Drawings and Details.

3.19 Protective Relaying Panel

The relay and control switchboards shall be furnished and installed by the Owner in the locations as shown on the Drawings and anchored onto the control room floor. All power, control, and fiber optic cables from the yard to the termination cabinet in the relay control house shall be furnished, installed, and terminated by the Contractor according to the Cable Schedule.

3.20 Fault Interrupters – NOT REQUIRED

3.21 Testing

The Contractor shall perform testing for:

a. Each control cable by means of meggering conductor-to-conductor and each conductor-to-ground prior to termination,

b. The Contractor shall verify each control cable for proper cable and conductor size, type, and labeling per the drawings.

c. Each control cable termination shall be verified per the interconnect drawings for proper conductor lugs, crimping, color codes, lock washers, and tightness.

d. The Contractor shall verify control circuit AC & DC molded-case circuit breakers and fuses of the correct size and type,

e. Installation of station service transformer, station service fused disconnect, and PT power fuses of the correct size and type per the drawings,

f. The Contractor shall verify the 120/240 AC station service systems for each source and transfer capability; branch circuits for proper magnitude and neutral and/or ground terminations at the destination, and

g. 48 VDC system branch circuits for proper magnitude, polarity, and termination at the destination.

The Contractor shall provide the required and acceptable documentation for all testing to the Owner.

3.22 Metalclad Switchgear Enclosure – NOT REQUIRED

3.23 Underground Circuit Plan

The six (6) 25kV Distribution underground circuit exit conduits shall be furnished and installed by the Contractor in the locations shown on the Drawings. The conduits and manholes shall be installed to the depths and locations shown on the Drawings. Permanently glue end caps for each conduit and elbows as well as encase in sand inside the fence and encase in 2000 psi concrete outside the fence. The power cables and terminations will be furnished and installed by Others. The non-metallic conduit shall be furnished and installed in accordance with drawings and specifications as described in Section 3.11. Any disturbances to the soil or asphalt shall be repaired by the Contractor.

4.0 Removals and Disposals

The Contractor's work shall include furnishing of all labor, tools and equipment, and materials as outlined in the following sections for the substation, for the removal and disposal of those materials and equipment. The Contractor shall be responsible for establishing final grade after the removal and disposal of the existing substation. The Contractor shall be responsible for any back-fill needed as well as loading, hauling, and proper disposal of any remaining unneeded spoils.

The Contractor will need to remove and dispose of the existing substation, existing control house and high-side structure. This includes but is not limited to all equipment, devices, cable, conduit, structures, above-grade grounding, and foundations, except as noted below:

The Contractor shall be responsible for removing all cables, control wires, grounds and bolted connections, and the Owner shall be responsible for loading, transporting, and off-loading of the batteries and circuit breakers. The Contractor shall be responsible for disassembling, loading, transporting, and off-loading all relay panels and instrument transformers from the existing substation and relocating the units to the Owner's warehouse for storage. The Contractor shall coordinate this activity with the Owner before transporting to the warehouse. The Contractor shall deliver to the Owner's warehouse all existing steel columns and beams. All existing hardware shall be disposed of by the Contractor.

Existing foundations shall be completely removed. No portion of any foundation shall be abandoned. All power and control wiring shall be completely removed from the conduit system. All existing conduit shall be completely removed. All existing ground taps to equipment and structures shall be removed to a minimum depth of six-inches below sub-grade. The existing below-grade grounding shall be left and shall be bonded to the new ground grid.

The Contractor shall completely remove all existing hand holes at the substation. This work includes re-establishing the final grade with select back-filling and proper compaction.

Backfill shall only be clean excavated material. Backfill shall be placed in horizontal layers not in excess of twelve (12) inches in thickness, and thoroughly compacted. Backfill shall be compacted to a minimum of ninety-five (95) percent Modified Proctor Density.

It will be the Contractor's responsibility to obtain any needed information during the site visit at the mandatory pre-bid meeting.

APPENDICES

1. Booth & Associates, LLC – Drawing List
2. Conduit / Cable Schedules
3. Owner-Furnished Material List
4. Technical Specifications: Oil Containment
5. Technical Specifications: Foundation
6. Technical Specifications: Structures & Equipment
7. Technical Specifications: Structural and Tubular Steel
8. Contractor-Furnished Cable Material List
9. Forms:
   a. Contractor's Concrete Test Sample Report
   b. Materials Receipt
   c. Ground System Test
10. Vicinity Map

1

Booth & Associates, LLC
Drawing List

PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA

PO HOFFER 69 X 25 X 15 KV SUBSTATION

LIST OF DRAWINGS

The work shall conform to the following Drawings by Booth and Associates, LLC, all of which form a part of these Specifications. The Contractor is responsible for contacting the Engineer if any drawings not indicated to be furnished at a later date are missing from their bid package. If the Bidder does not contact the Engineer regarding any drawings, their bid will be considered based on all Drawings and Specifications, as issued for bids.

STRUCTURES AND EQUIPMENT

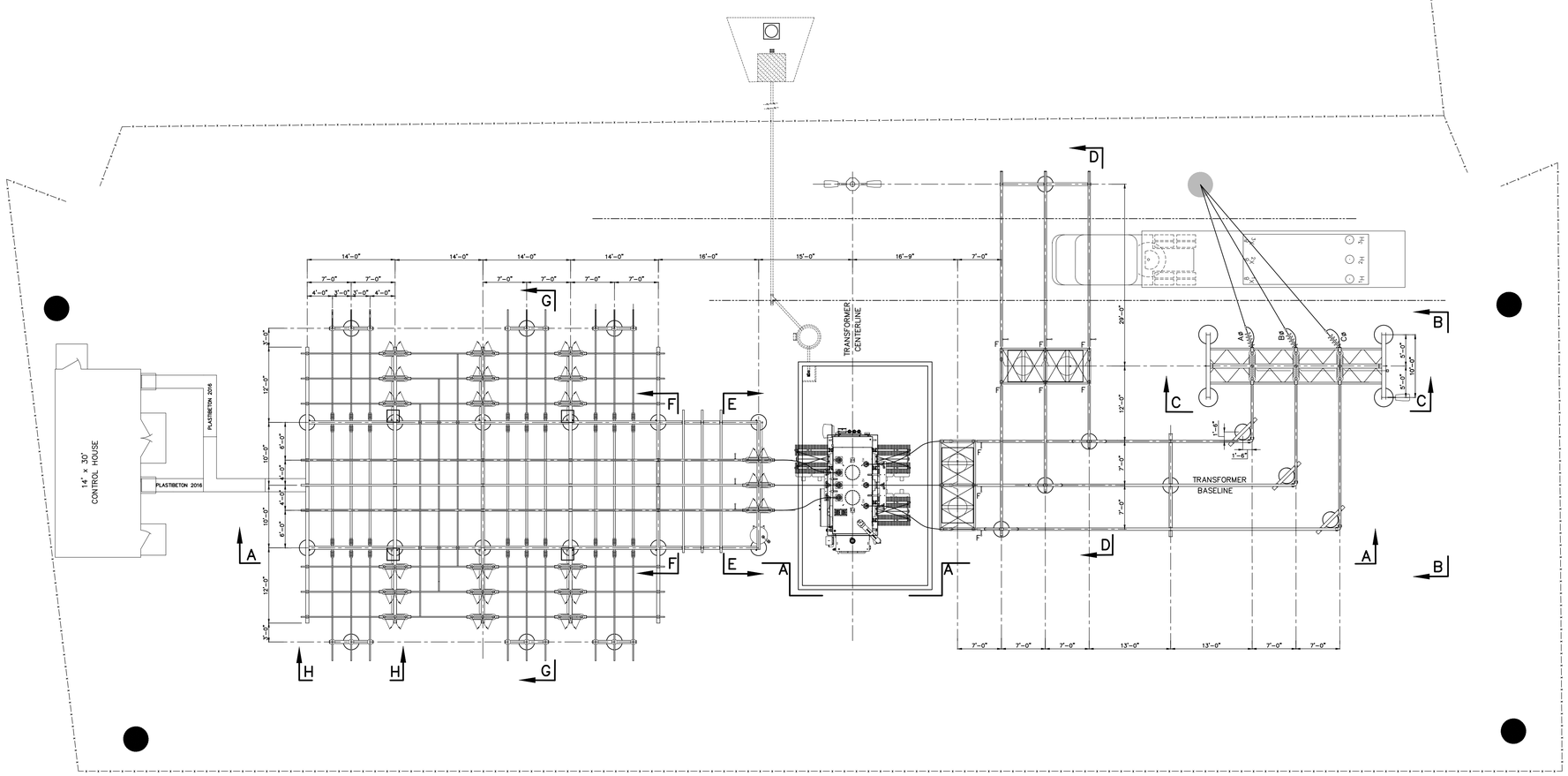
Sheet No.	Title
GA1	Plan View
GA2	Section View A-A
GA3	Section Views B-B, C-C
GA4	Section Views D-D, E-E, F-F, G-G
GA5	Details

GENERAL

Sheet No.	Title
E01	One Line
CE1	Circuit Exit Plan
G1	Grounding Plan
G2	Grounding Details
C1	Conduit & Cable Plan
C2	Trench & Conduit Details
CH1	Control House Plan and Sections
CH2	Control House Details
S1	Site Plan

FOUNDATION AND OIL CONTAINMENT DRAWINGS

Sheet No.	Title
FP1 of 1	Foundation Plan
FD1 of 7	Pad 1 Details
FD2 of 7	Section Views A-A, B-B, C-C
FD3 of 7	Pad 2 & 3 Details
FD4 of 7	Pad 4 Control House Details
FD5 of 7	Pier 1, 2 & 3 Details
FD6 of 7	Pier 4, 5 & 6 Details
FD7 of 7	Typical Pedestal, Transformer, OC Wall & Pad Rebar Details
OC1 of 3	Oil Containment System Plan
OC2 of 3	Oil Containment System Sections
OC3 of 3	Oil Containment System Details



STATION DESIGN DATA

STRUCTURE, APPARATUS AND LIGHTNING ARRESTERS ARE ALL GROUNDED TO THE SAME GROUNDING SYSTEM.
STATION DESIGNED FOR THE FOLLOWING ELECTRICAL CLEARANCES/SPACINGS:

RATED KV	BIL KV	RIGID BUS CONDUCTORS (IEEE, NEMA, NESC) CLEARANCE (1)				VERTICAL CLEARANCE OF UNGUARDED PARTS	GROUP-OPERATED SWITCHES (NEMA) ℄ TO ℄ SPACING (2)		
		PHASE TO PHASE ℄ TO ℄ (3)	METAL TO METAL (4)	PHASE TO GROUND (5)	CLEARANCE ABOVE GRADE (6)		HORN GAP VERT./HOR. BREAK	DISCONNECT VERTICAL BREAK	DISCONNECT HORIZONTAL BREAK
69	350	5'-0"	2'-7"	2'-6"	11'-0"	10'-5"	7'-0"	5'-0"	6'-0"
15	110	2'-0"	0'-12"	0'-10"	9'-0"	9'-0"	3'-0"	2'-0"	2'-6"

NOTES:
1. "CLEARANCE" IS DEFINED AS A SURFACE-TO-SURFACE MEASUREMENT.
2. "SPACING" IS DEFINED AS A ℄ TO ℄ MEASUREMENT.
3. INTENDED FOR PHASES ORIENTED IN PARALLEL RUNS.
4. INTENDED FOR NON-PARALLEL POINTS OF CROSSING.
5. EXCEEDS MIMIMUM CLEARANCES TO MATCH NEMA STANDARD POST INSULATOR DIMENSIONS.
6. ROUNDED UP TO THE NEAREST EVEN FOOT, PER NESC (2002). MEASURED FROM TOP OF EQUIPMENT FOUNDATIONS, IF SUITABLE FOR PEDESTRIAN ACCESS.

DEADEND STRUCTURE(S) SHALL WITHSTAND 0° TO 15° LINE TAKE-OFF IN ANY DIRECTION WITH A DESIGN LINE TENSION OF _____ POUNDS PER CONDUCTOR.
*A MINIMUM VERTICAL CLEARANCE OF 8'-6" SHALL BE MAINTAINED FOR ANY SURFACE OF INDETERMINATE POTENTIAL SUCH AS LIGHTNING ARRESTERS, UNGROUNDED SURFACES, BUSHINGS, AS PER NESC RULE 124.A.3.

CONDUCTOR/BUS AMPACITIES

CONDUCTOR	APPROX. CURRENT CARRYING CAPACITY*
TUBING, 4" NPS SCH. 80 AL.	3720 AMPS.
TUBING, 3" NPS SCH. 80 AL.	2760
TUBING, 2" NPS SCH. 80 AL.	1700
TUBING, 4" NPS SCH. 40 AL.	3165
TUBING, 3" NPS SCH. 40 AL.	2425
TUBING, 2" NPS SCH. 40 AL.	1465
ACSR, 1272 MCM, 26/7	1200
ACSR, 954 MCM, 26/7	1010
ACSR, 795 MCM, 26/7	900
ACSR, 336.4 MCM, 18/1	530
ACSR, 2/0 AWG, 6/1	340
ACSR, 1/0 AWG, 6/1	230
COPPER, 1000 MCM, 61 STD.	1285
COPPER, 750 MCM, 61 STD.	1075
COPPER, 500 MCM, 37 STD.	830
COPPER, 4/0 AWG, 7 STD.	480
COPPER, 2/0 AWG, 7 STD.	355
COPPER, #2 AWG, SOLID	231
UABC, 4" x 4" x 3/8"	3125
UABC, 4" x 4" x 1/4"	2625
AL, BAR 3" x 1/2"	1350
AL, BAR 3" x 1/4"	938
INSUL. 1/0 34.5KV J.C.N.	235

* AC. 60 HZ, 40° C AMBIENT, 50° C RISE HORIZONTAL ORIENTATION, OUTDOORS, WIND = 2 FPS

PLAN VIEW

SCALE: 3/32" = 1'-0"

EQUIPMENT BOLT TORQUING TABLE

DIAMETER BOLT (INCHES)	RECOMMENDED TORQUE NON-LUBRICATED STEEL & SILICON BRONZE HARDWARE (FOOT*LBS)	RECOMMENDED TORQUE LUBRICATED HARDWARE & ALUMINUM HARDWARE (FOOT*LBS)
1/2"	40	25
5/8"	55	40
3/4"	70	60

INSTALLATION NOTES:

1. MATERIALMAN/FABRICATOR VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ONTO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. EQUIPMENT VIEW IS PRELIMINARY. WAITING ON VENDOR DRAWINGS.
3. CONTRACTOR TO BRING GRADE AROUND NEW A-FRAME UP TO MATCH FOUNDATION REVEALS TO ALLOW ACCESS TO BREAKER AND SWITCH OPERATORS.
4. MINOR GRADING TO BE DISCUSSED AT PRE-BID MEETING

LEGEND:

- STATIC POLE
- AREA LIGHTS
- F FIXED CONNECTION
- S SLIP FIT

REFERENCES

SITE PLAN _____ 12513S1
SECTION VIEWS _____ 12513GA2-GA4
DETAILS _____ 12513GA5
FOUNDATION PLAN _____ 12513FD1

PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

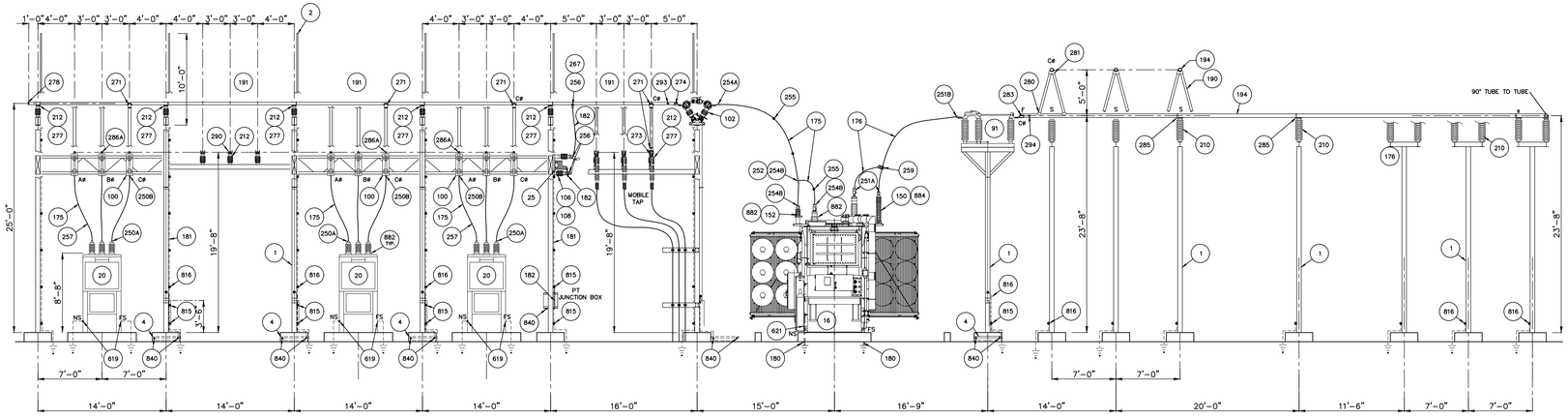
PRELIMINARY - DO NOT USE FOR CONSTRUCTION

NO.	REVISIONS	ENG.	DATE
A.	ISSUED FOR BID	BWJ	05/05/22

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: PLAN VIEW

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	3/32"=1'-0"
FILE NUMBER:	12513
SHEET:	GA1



SECTION A–A

SCALE: 1/8"=1'-0"

INSTALLATION NOTES:

1. MATERIALMAN/FABRICATOR VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ONTO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. EQUIPMENT VIEW IS PRELIMINARY. WAITING ON VENDOR DRAWINGS.
3. CONTRACTOR TO BRING GRADE AROUND NEW A–FRAME UP TO MATCH FOUNDATION REVEALS TO ALLOW ACCESS TO BREAKER AND SWITCH OPERATORS.

REFERENCES

SITE PLAN	12513S1
PLAN VIEW	12513GA1
SECTION VIEWS	12513GA2–GA4
DETAILS	12513GA5
FOUNDATION PLAN	12513FD1
GROUNDING PLAN	12513G1
CONDUIT PLAN	12513C1

PWC Fayetteville's HOMETOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

PRELIMINARY – DO NOT USE FOR CONSTRUCTION

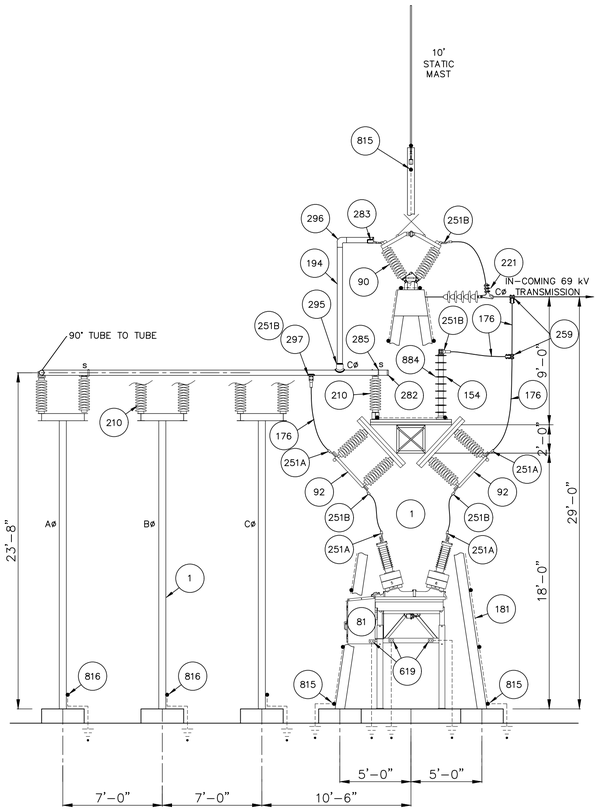
NO.	REVISIONS	ENG.	DATE
A.	ISSUED FOR BID	BWJ	05/05/23

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: SECTION A–A

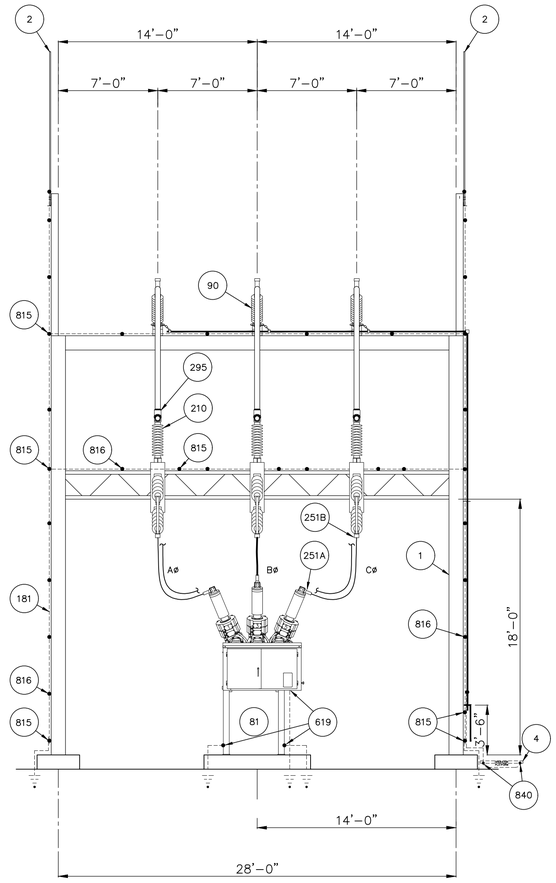
DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	1/8"=1'-0"
FILE NUMBER:	12513

SHEET: GA2



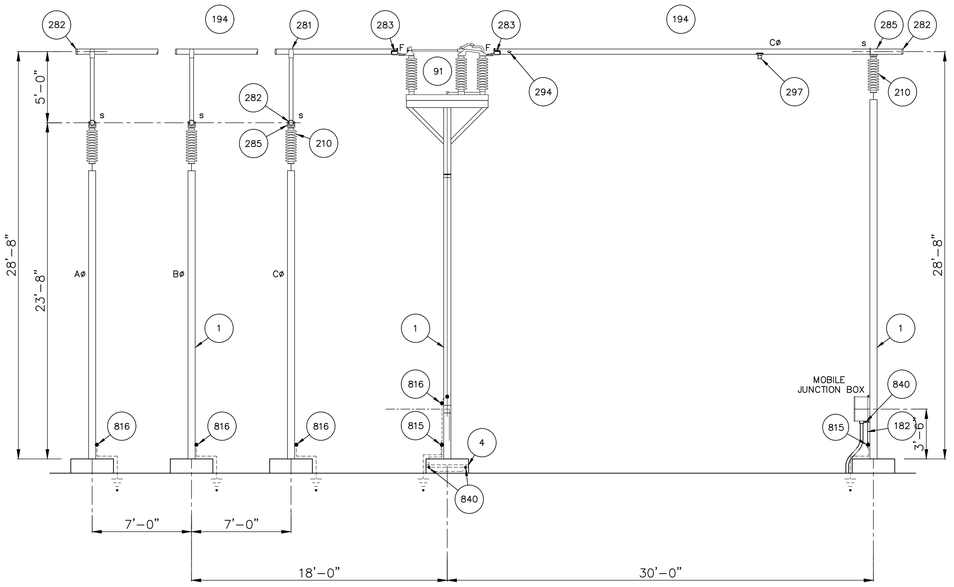
SECTION B–B

SCALE: 3/16"=1'-0"



SECTION C–C

SCALE: 3/16"=1'-0"



SECTION D–D

SCALE: 3/16"=1'-0"

INSTALLATION NOTES:

1. MATERIALMAN/FABRICATOR VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ONTO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. EQUIPMENT VIEW IS PRELIMINARY. WAITING ON VENDOR DRAWINGS.

REFERENCES

SITE PLAN	12513S1
PLAN VIEW	12513GA1
SECTION VIEWS	12513GA2–GA4
DETAILS	12513GA5
FOUNDATION PLAN	12513FD1
GROUNDING PLAN	12513G1
CONDUIT PLAN	12513C1

PWC Fayetteville's HOMETOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

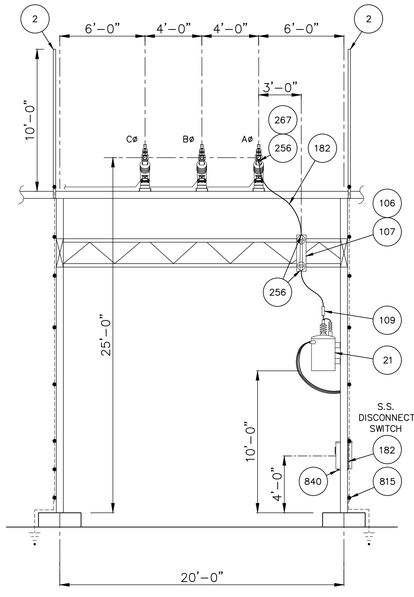
PRELIMINARY – DO NOT USE FOR CONSTRUCTION

NO.	REVISIONS	ENG.	DATE
A.	ISSUED FOR BID	BWJ	05/05/23

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

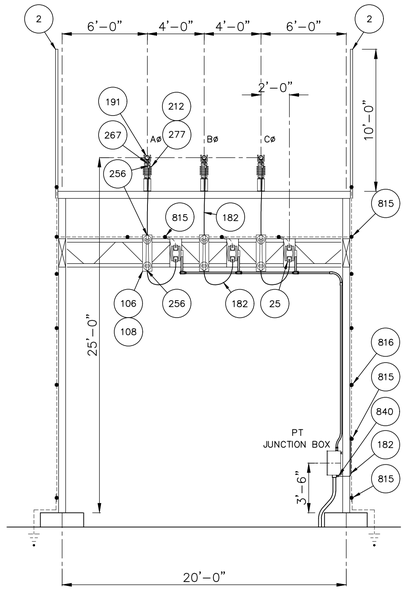
DRAWING TITLE: SECTIONS B–B, C–C, D–D

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	3/16"=1'-0"
FILE NUMBER:	12513
SHEET:	GA3



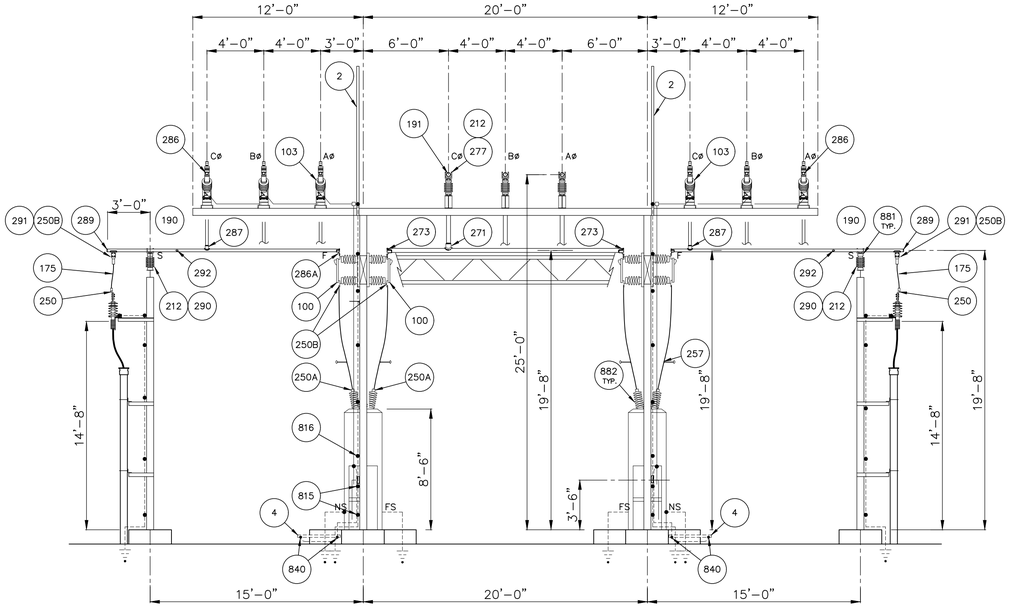
SECTION E–E

SCALE: 3/16"=1'–0"



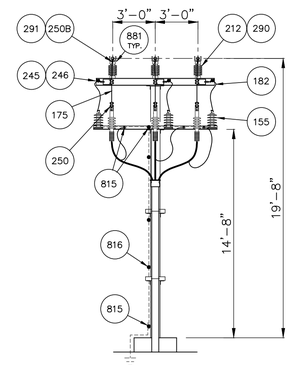
SECTION F–F

SCALE: 3/16"=1'–0"



SECTION G–G

SCALE: 3/16"=1'–0"



SECTION H–H

SCALE: 3/16"=1'–0"

INSTALLATION NOTES:

1. MATERIALMAN/FABRICATOR VERIFY THAT CONDUCTOR TERMINAL PADS MATCH AND FIT ONTO SWITCH TERMINAL PADS (SIZE, NEMA RATING AND SHOULDER).
2. EQUIPMENT VIEW IS PRELIMINARY. WAITING ON VENDOR DRAWINGS.

REFERENCES

SITE PLAN	12513S1
PLAN VIEW	12513GA1
SECTION VIEWS	12513GA2–GA4
DETAILS	12513GA5
FOUNDATION PLAN	12513FD1
GROUNDING PLAN	12513G1
CONDUIT PLAN	12513C1

PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

PRELIMINARY – DO NOT USE FOR CONSTRUCTION

NO.	REVISIONS	ENG.	DATE
A.	ISSUED FOR BID	BWJ	05/05/23

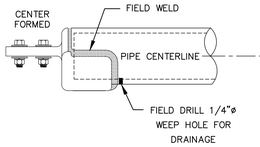
PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: SECTIONS E–E, F–F, G–G, H–H

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	3/16"=1'–0"
FILE NUMBER:	12513

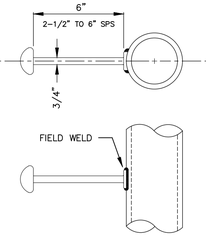
SHEET: GA4

TUBE	BOLT CIRCLE	A	B	BOM ITEM
2"	3"	6 3/4"	2 3/4"	290
3"	3"	6 3/4"	3 5/8"	277
4"	3"	9 1/8"	4 1/2"	285



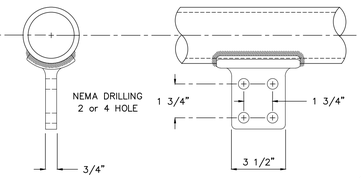
DETAIL No. 1

N.T.S.



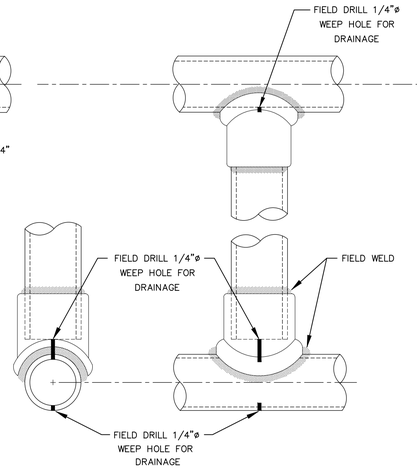
DETAIL No. 2

N.T.S.



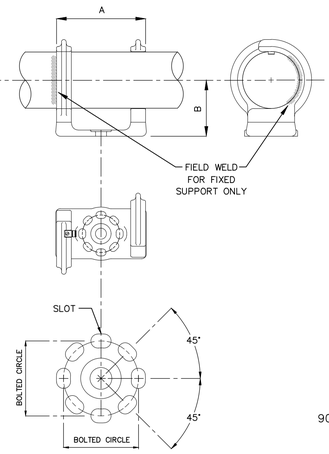
DETAIL No. 3

N.T.S.



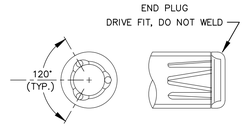
DETAIL No. 4

N.T.S.



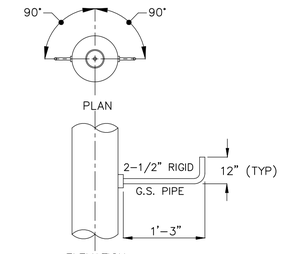
DETAIL No. 5

N.T.S.



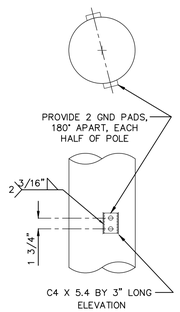
DETAIL No. 6

N.T.S.



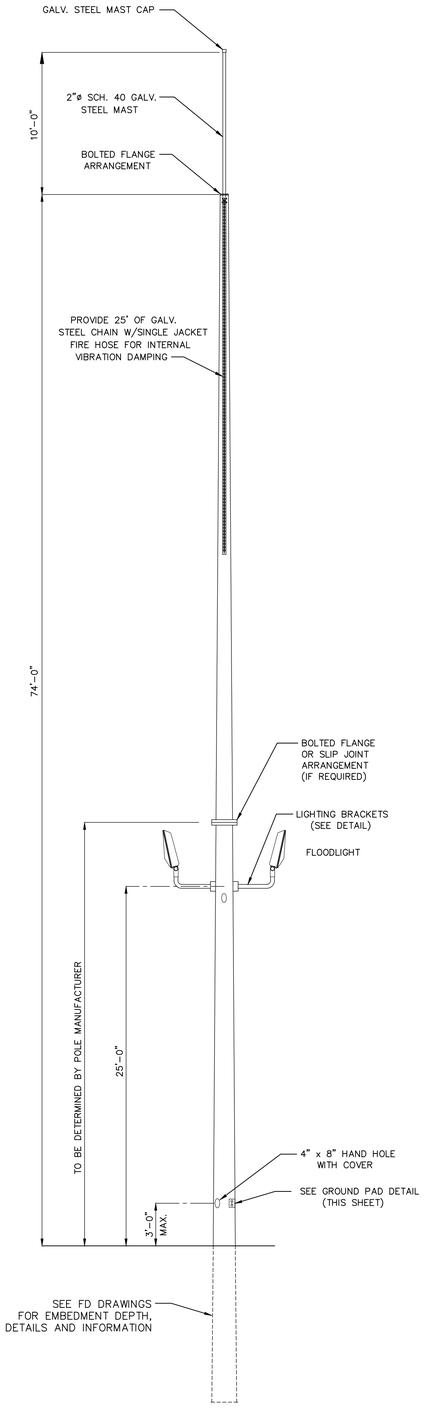
LIGHTING BRACKET DETAIL

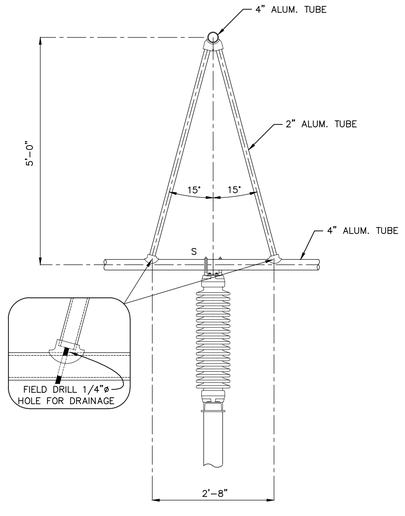
N.T.S.



GROUND PAD DETAIL

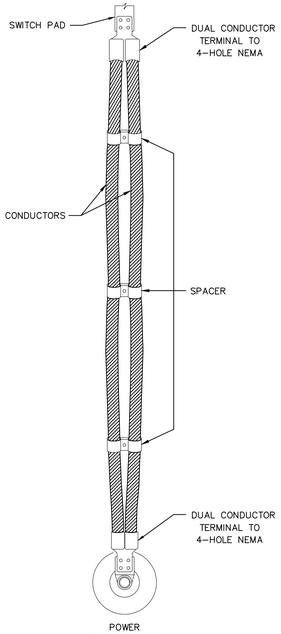
N.T.S.





DETAIL No. 7

N.T.S.

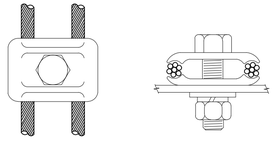


TYPICAL
POWER TRANSFORMER SECONDARY
CONNECTIONS FOR DUAL
CONDUCTORS

DETAIL No. 8

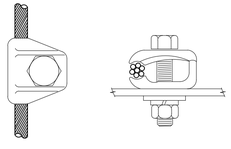
N.T.S.

USE TO ATTACH GRID TAPS TO STRUCTURE CONDUCTORS, AND AT PERPENDICULAR RUNS TO EQUIPMENT ETC.



DUAL CONDUCTORS
ANDERSON CATALOG TYPE GC143

USE EVERY FOUR FEET TO SUPPORT GROUND CONDUCTOR ON COLUMNS, BEAMS, AND TRUSSES



SINGLE CONDUCTOR
ANDERSON CATALOG TYPE GC141

TYPICAL STRUCTURE GROUND CONDUCTOR ATTACHMENT

N.T.S.

PWC Fayetteville's HOME/TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
N.C.F.-0221

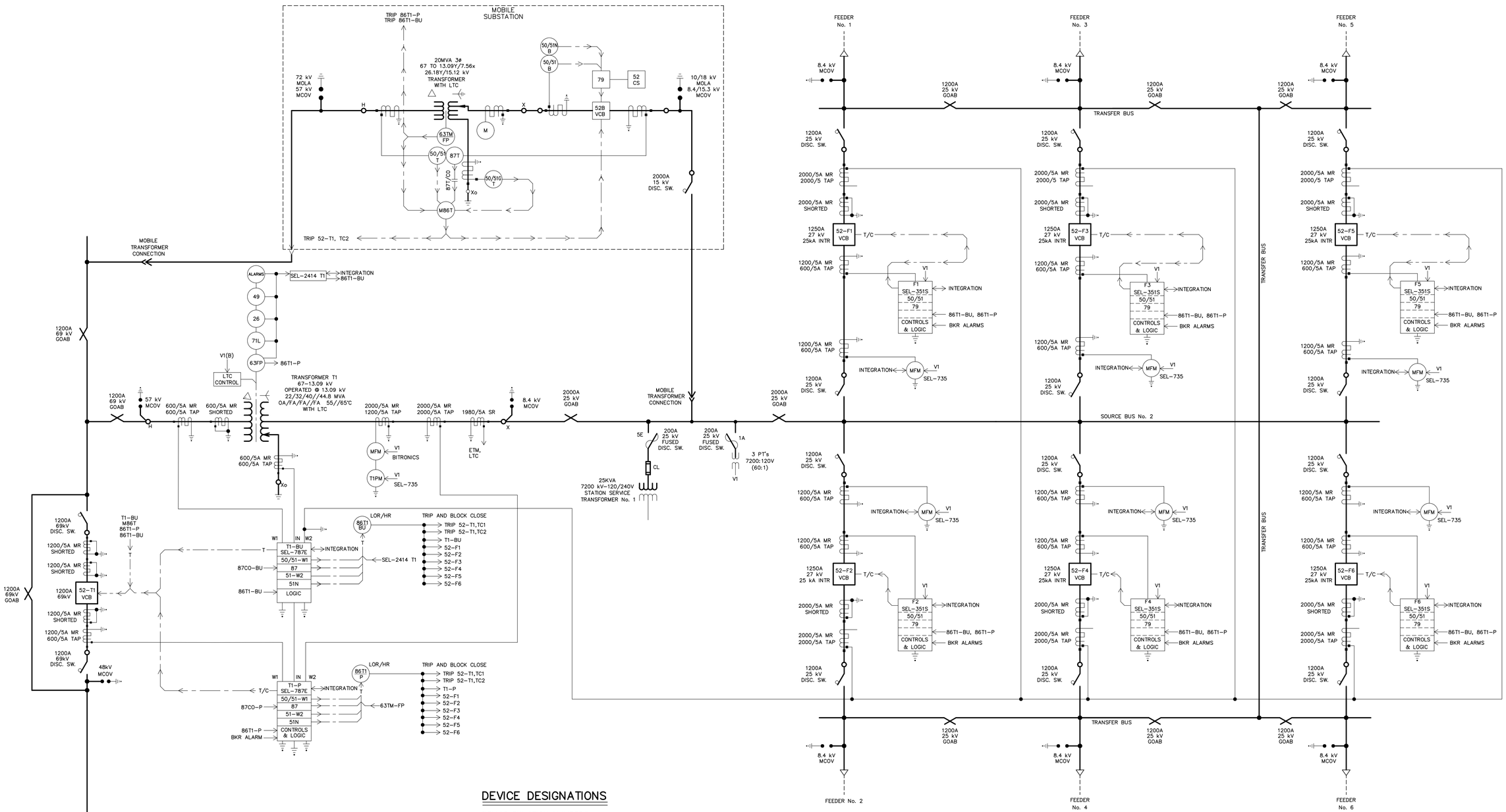
PRELIMINARY – DO NOT USE FOR CONSTRUCTION

NO.	REVISIONS	ENG.	DATE
A.	ISSUED FOR BID	BWJ	05/05/23

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: DETAILS

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	NONE
FILE NUMBER:	12513
SHEET:	GA5



DEVICE DESIGNATIONS

DEVICE FUNCTION NUMBERS

49	TRANSFORMER WINDING TEMP
50/51	INST/TIME OVERCURRENT
50FB	INST FAST BUS OVERCURRENT
52	AC CIRCUIT BREAKER
52__-P	MULTIFUNCTION BREAKER RELAY
63FP	FAULT PRESSURE DEVICE/RELAY
63TM-FP	MOBILE SUB FAULT PRESSURE
71	TRANSFORMER LIQUID LEVEL
79	RECLOSING RELAY FUNCTION
81	FREQUENCY RELAY FUNCTION
86T1-P/-BU	LOCKOUT RELAY-PRIMARY/BACKUP
87	DIFFERENTIAL RELAY FUNCTION
87CO	DIFFERENTIAL CUTOFF
T1-P/T1-BU	MULTIFUNCTION TRANSFORMER RELAYS
M86T	MOBILE SUB LOR MULTI-FUNCTION
MFM	MULTIFUNCTION METER

LETTER CODES

V1 (B)	RELAY POTENTIAL - 15kV (PHASE)

SUFFIXES

GCB	GAS CIRCUIT BREAKER
GOAB	GROUP OPERATED AIR BREAK
MOLA	METALLIC OXIDE LIGHTNING ARRESTER
MCOV	MAXIMUM CONTINUOUS OPERATING VOLTAGE
VCB	VACUUM CIRCUIT BREAKER

NOTES:

1.) BREAKER CONTROLS PERFORMED BY SEL-351S PUSHBUTTONS

2.) DIFFERENTIAL CUT-OFFS (87CO) PERFORMED BY CONTROL SWITCHES ON RELAY PANEL

3.) OTHER CONTROL SWITCH FUNCTIONS (71L-CO, 26/49-CO; etc.) PERFORMED BY LOCAL BITS IN T1-P & T1-BU RELAYS.

LEGEND

- HIGH VOLTAGE CIRCUITS
- LOW VOLTAGE CIRCUITS
- UNDERGROUND FEEDER EXIT
- DIRECTION OF RELAY ACTION

PWC Fayetteville's HOMETOWN UTILITY

Booth & Associates
SBR Glenwood Avenue, Raleigh NC 27612
NC F-0221

PRELIMINARY - DO NOT USE FOR CONSTRUCTION

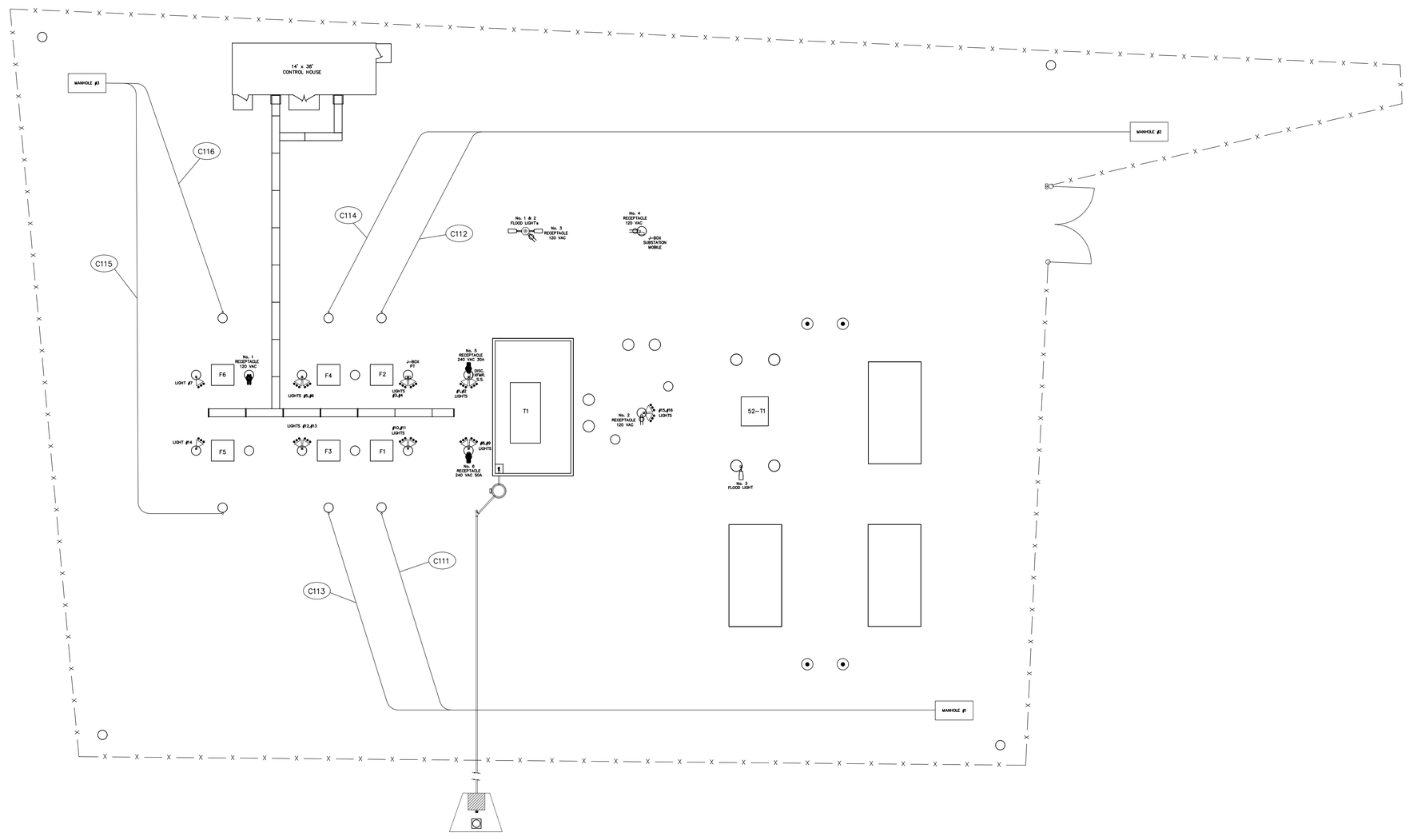
NO.	REVISIONS	ENG.	DATE
A.	ISSUED FOR BID	BWJ	05/05/23

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: ONE LINE DIAGRAM

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	NTS
FILE NUMBER:	12513

SHEET: E01



NOTES:

1. CONDUITS ARE SHOWN WITH AN OVAL SYMBOL ⬭ AND A DESIGNATED CABLE NUMBER
2. REFER TO CONDUIT & CABLE SCHEDULE FOR CONDUIT SIZE, CABLE INSTALLATION NOTES & CABLE COLOR CODES.

INSTALLATION INSTRUCTIONS:

(1) INSTALL: (3) 5'–0" X 10'–0" MANHOLES, PWC TO SUPPLY. CONTRACTOR TO PICK UP AT PWC WAREHOUSE.

LEGEND

- ⬭ CONDUIT NUMBER
- ○ FOUNDATIONS
- —— X —— FENCE
- ▭ BRICK AND BLOCK WALL
- o—— INDICATES 6" PVC SCH. 40 CONDUIT TO BE INSTALLED 24" BELOW FINISHED GRADE, UNLESS OTHERWISE INDICATED.
- ▭ 5'–0" X 10'–0" MANHOLE

REFERENCE:

CONDUIT PLAN 12502C1
FOUNDATION PLAN 12502FP1

PWC Fayetteville's HOME/TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

PRELIMINARY – DO NOT USE FOR CONSTRUCTION

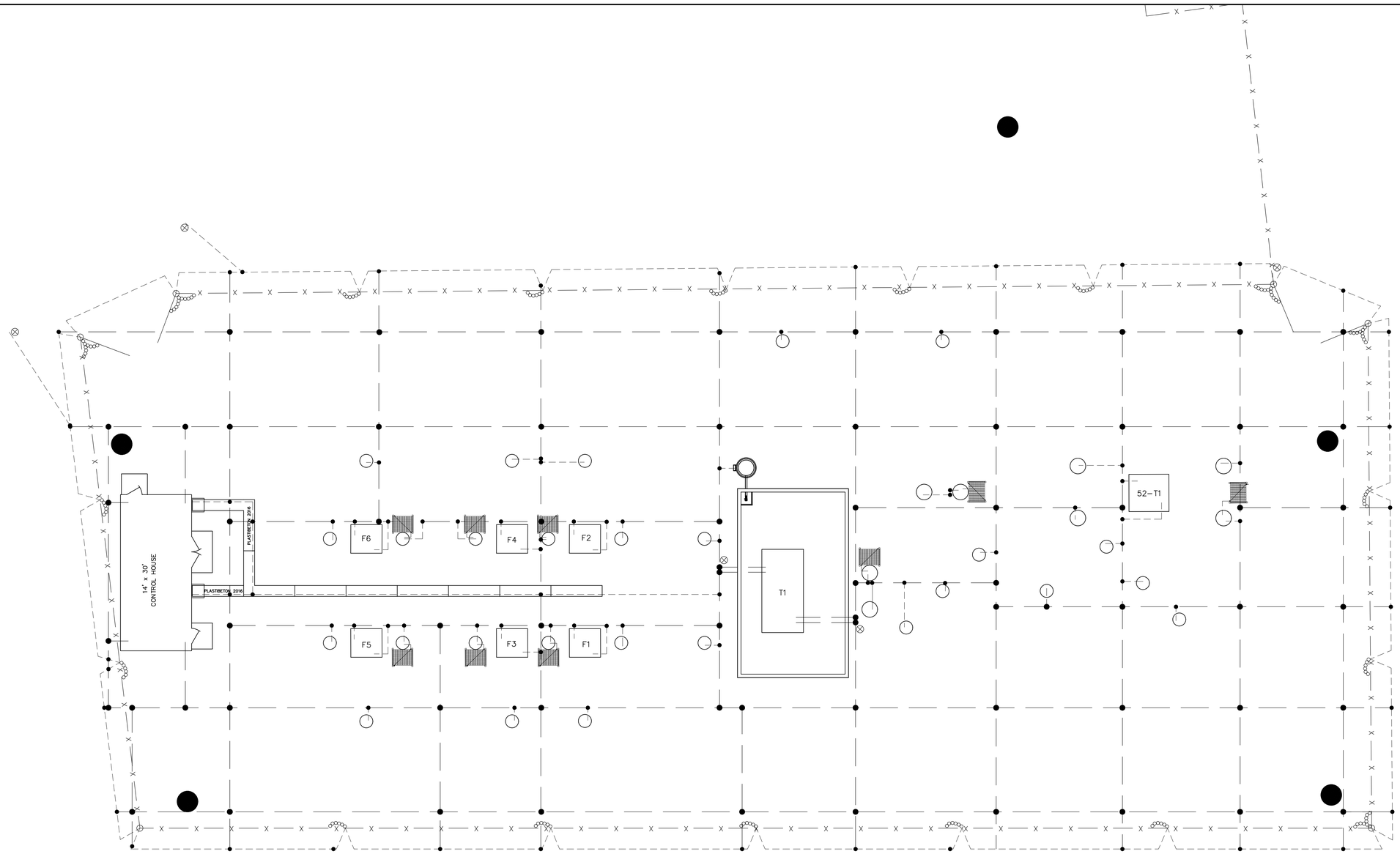
NO.	REVISIONS	ENG.	DATE
A.	ISSUED FOR BID	BWJ	05/05/23

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: CIRCUIT EXIT PLAN

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	1/16"=1'-0"
FILE NUMBER:	12513

SHEET: CE1



GROUNDING PLAN

SCALE: 3/32"=1'-0"

GROUNDING NOTES:

1. ALL APPARATUS (TRANSFORMERS, REGULATORS, CIRCUIT BREAKERS. ETC.) SHALL HAVE TWO SEPARATE CONNECTIONS TO GROUND GRID.
2. TRANSFORMER CONNECTIONS TO THE GROUND GRID SHALL BE PARALLEL 4/0 AWG BARE COPPER.
3. GROUND GRID SHALL BE BURIED A MINIMUM OF 36" BELOW FINISHED SUBSTATION GRADE.
4. FINISHED SUBSTATION GRADE INCLUDES 3" WASHED STONE AND 3" OF CRUSHER RUN ABOVE SUBGRADE.
5. LOCATE ALL UNDERGROUND FACILITIES (DUCT BANKS, TRENCH, CONTROL OR POWER CABLES, ETC.) BEFORE INSTALLING GRID CONDUCTORS. COORDINATE CONSTRUCTION WITH BELOW GRADE UTILITIES.
6. SWITCH OPERATOR PLATFORMS SHALL BE LOCATED ON THE SAME SIDE OF SWITCH AS OPERATING HANDLE.
7. TEST EACH GROUND ROD PRIOR TO CONNECTION TO THE GROUND GRID. EACH 30' GROUND ROD SHOULD READ 10 OHMS OR LESS. IF THE READING EXCEEDS THIS VALUE CONTACT THE ENGINEER.
8. TEST THE GROUND GRID SYSTEM BEFORE ENERGIZING THE SUBSTATION AND WHILE ISOLATED FROM TRANSMISSION OR DISTRIBUTION SYSTEM(S). IF THE READING EXCEEDS 5 OHMS, CONTACT THE ENGINEER.
9. GROUND GRID MUST BE INSTALLED BEFORE THE OIL CONTAINMENT SYSTEM.
10. INSTALL GROUND GRID BEFORE INSTALLING CABLE TRENCH. COORDINATE CONSTRUCTION EFFORTS.
11. INSTALL 2/0 AWG. CU. GROUND ALONG LENGTH OF ALL TRECH. SUPPORT GROUND AT TOP OF TRENCH INSIDE WALL. BOND TO GROUND GRID AT EACH INTERSECTION.

LEGEND

- FENCE
- 4/0 AWG. S.D. BARE COPPER
- 2/0 AWG. S.D. BARE COPPER
- GRID CONNECTORS: CADWELD TYPE
- 5/8" DIA. COPPERWELD GROUND RODS, (30') 3-10' SECTIONS AT EACH LOCATION (UNLESS NOTED OTHERWISE)
- SWITCH OPERATOR PLATFORM
- CONCRETE PAD
- CONCRETE PIER
- CABLE TRENCH

REFERENCE:

SITE PLAN	12513S1
GROUNDING DETAILS	12513G2
CONDUIT PLAN	12513C1
FOUNDATION PLAN	12513FP1

PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

PRELIMINARY – DO NOT USE FOR CONSTRUCTION

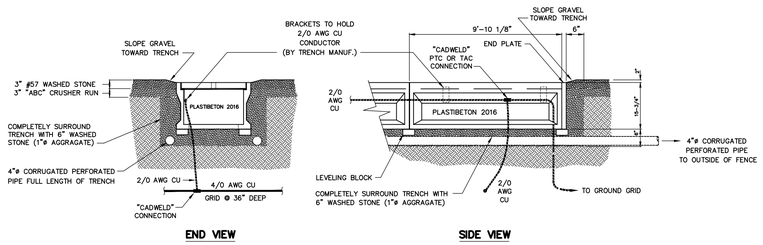
NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	BWJ	05/05/22

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: GROUNDING PLAN

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	3/32"=1'-0"
FILE NUMBER:	12513

SHEET: G1

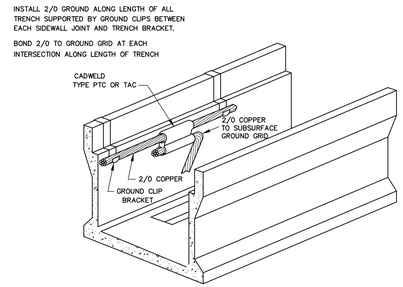


END VIEW

SIDE VIEW

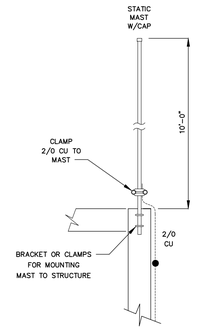
TYPICAL TRENCH GROUNDING DETAIL

N.T.S.



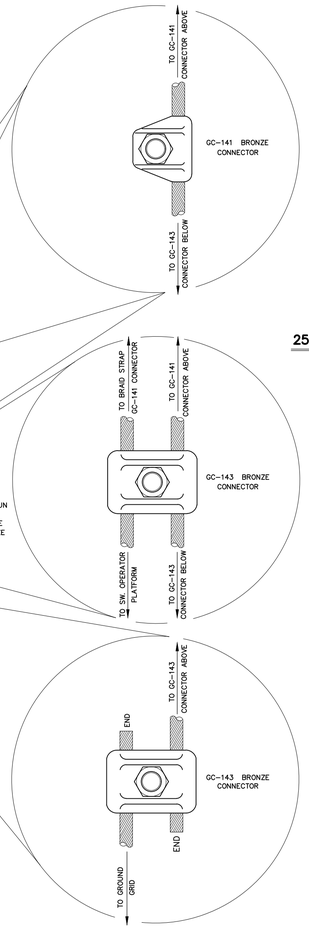
GROUND CLIP DETAIL

(N.T.S)



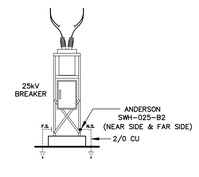
TYPICAL STATIC MAST

N.T.S.



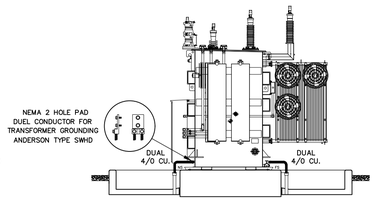
GOAB GROUNDING DETAIL

N.T.S.



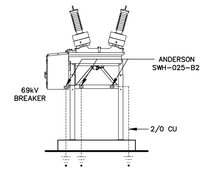
25kV BREAKER GROUNDING DETAIL

N.T.S.



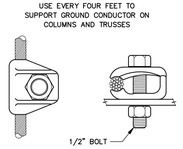
POWER TRANSFORMER GROUNDING DETAIL

N.T.S.



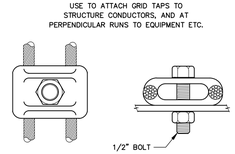
69kV BREAKER GROUNDING DETAIL

N.T.S.



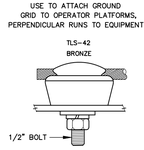
SINGLE CONDUCTOR

ANDERSON TYPE GC-141A-02



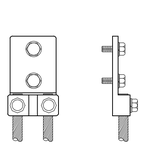
DUAL CONDUCTORS

ANDERSON TYPE GC-143A-02



SINGLE CONDUCTOR

ANDERSON TYPE TLS-42



NEMA 2 HOLE PAD DUEL CONDUCTOR FOR TRANSFORMER GROUNDING

ANDERSON TYPE SWHD

TYPICAL STRUCTURE GROUND CONDUCTOR ATTACHMENT

N.T.S.

PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

PRELIMINARY - DO NOT USE FOR CONSTRUCTION

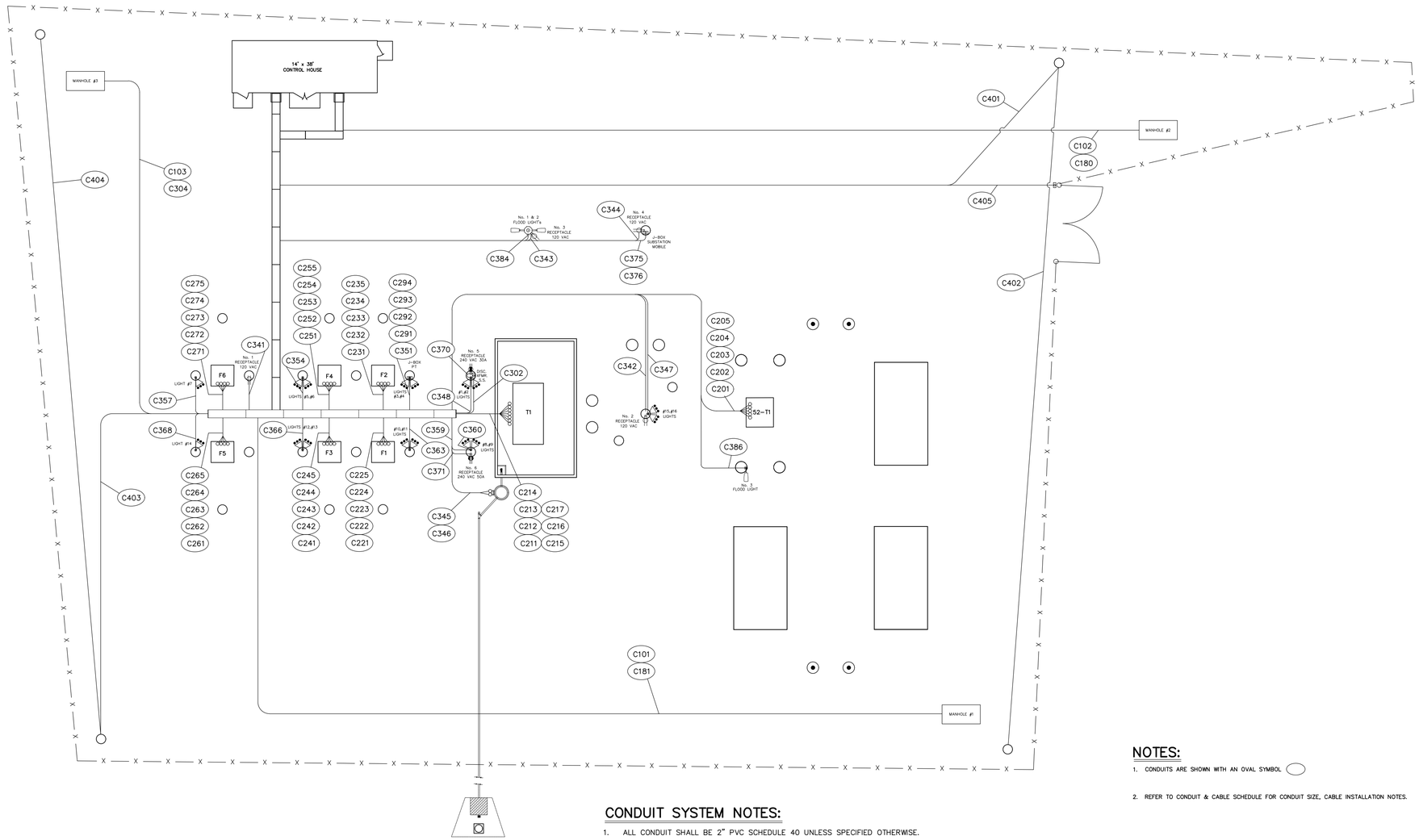
© 03/2022

NO.	REVISIONS	ENG.	DATE
A.	ISSUED FOR BID	BWJ	05/05/22

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: GROUNDING DETAILS

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	NTS
FILE NUMBER:	12513
SHEET:	G2



CONDUIT PLAN

SCALE: 1/16"=1'-0"

CONDUIT SYSTEM NOTES:

1. ALL CONDUIT SHALL BE 2" PVC SCHEDULE 40 UNLESS SPECIFIED OTHERWISE.
2. ALL CONDUITS, FITTINGS, JUNCTION BOXES, ENCLOSURES, COUPLINGS AND MISCELLANEOUS CONDUIT MATERIALS SHALL BE FURNISHED BY THE SUBSTATION CONTRACTOR, EXCEPT WHERE NOTED OTHERWISE.
3. INSTALLATION OF CONDUIT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
4. ELECTRICAL DEVICES (LIGHTS, RECEPTACLES, WIRE, LUGS, WIRE NUTS, ETC.) SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. ALL OPEN CONDUIT STUBS EXPOSED TO WEATHER SHALL BE CAPPED UNTIL TERMINATION IS COMPLETED.
6. CONDUITS FOR FUTURE CABLE INSTALLATION SHALL HAVE A PULL STRING INSTALLED AND SHALL BE CAPPED AT BOTH ENDS BY CONTRACTOR.
7. AC POWER SUPPLY AND CONTROL CABLES SHOULD NOT TO BE INCLUDED IN THE SAME CONDUIT.
8. ALL METALLIC JUNCTION BOXES, RACEWAYS, CABLE TRAYS, PANELS, AND ENCLOSURES SHALL BE BONDED TO THE SUBSTATION GROUND GRID.
9. ALL AC SERVICE NEUTRALS SHALL BE BONDED TO GROUND AT THE SERVICE PANEL AND AT THE POINT OF TERMINATION.
10. CONTROL HOUSE INTERIOR ELECTRICAL DEVICES (LIGHTS, RECEPTACLES, WIRE, WIRE NUTS, ETC.) BE SUPPLIED AND INSTALLED BY CONTROL HOUSE CONTRACTOR.
11. OUTDOOR RECEPTACLES, J-BOXES, CONDUIT, FITTINGS, WIRE TERMINALS, CABLE CABLE TRENCH, PULL-BOXES, VT JUNCTION BOXES, AND OUTDOOR LIGHTING SHALL BE PROVIDED BY CONTRACTOR.
12. FIBER NETWORK ACCESS POINTS FROM CLIENT.

NOTES:

1. CONDUITS ARE SHOWN WITH AN OVAL SYMBOL
2. REFER TO CONDUIT & CABLE SCHEDULE FOR CONDUIT SIZE, CABLE INSTALLATION NOTES.

LEGEND

- CONDUITS
- PIERS AND FOUNDATIONS
- FENCE
- CABLE TRENCH
- INDICATES 2" PVC SCH. 40 CONDUIT TO BE INSTALLED 24" BELOW FINISHED GRADE, UNLESS OTHERWISE INDICATED.
- STATIC POLE WITH LIGHT FIXTURES
- SECURITY LED LIGHT FIXTURES
- MANHOLE

ELECTRICAL LEGEND

- 240 VAC 30A RECEPTACLE
- 240 VAC 50A RECEPTACLE
- 120 VAC RECEPTACLE
- 120 VAC LED LIGHT FIXTURE

REFERENCE:

CONDUIT DETAILS	12502C2
FOUNDATION PLAN	12502FP1

PWC Fayetteville's HOME/TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

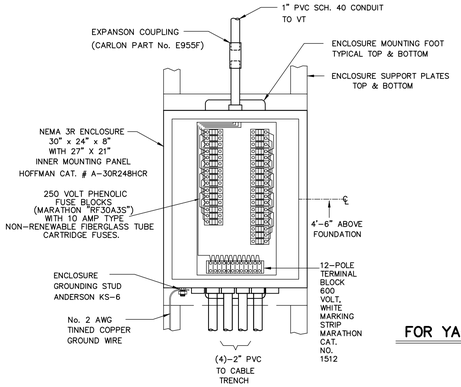
PRELIMINARY – DO NOT USE FOR CONSTRUCTION

NO.	REVISIONS	ENG.	DATE

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

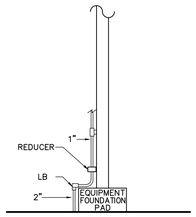
DRAWING TITLE: CONDUIT AND CABLE PLAN

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	1/16"=1'-0"
FILE NUMBER:	12513
SHEET:	C1



PWC V.T. JUNCTION BOX

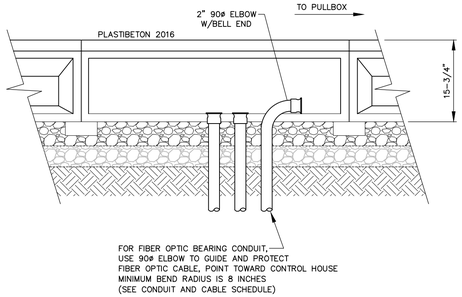
(1 REQUIRED)
(N.T.S.)



(USING LB'S)

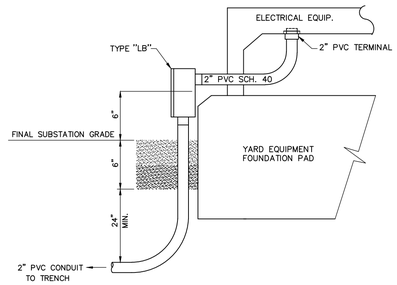
TYPICAL CONDUIT ENTRY FOR YARD RECEPTACLES & YARD LIGHTS

(N.T.S.)



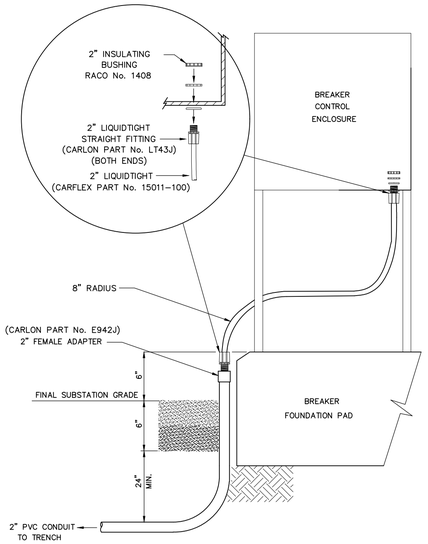
FIBER OPTIC CONDUIT DETAIL

(TYPICAL)
(N.T.S)



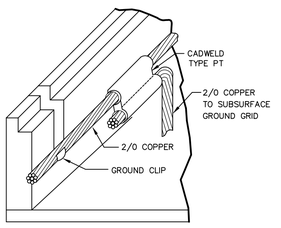
TYPICAL CONDUIT ENTRY FOR SUBSTATION EQUIPMENT

(N.T.S.)



FIBER CABLE CONDUIT ENTRY

FOR RECLOSERS
(N.T.S)

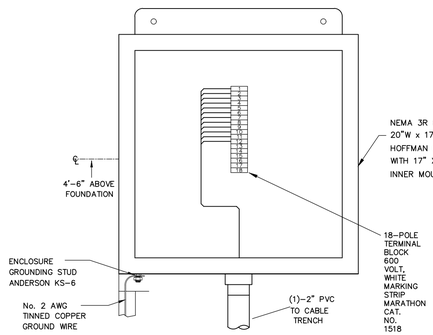


GROUND CLIP DETAIL

(N.T.S)

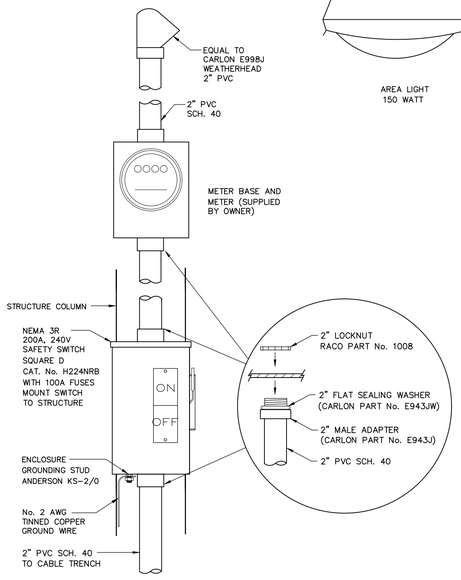
INSTALL 2/0 GROUND ALONG LENGTH OF ALL TRENCH SUPPORTED BY GROUND CLIPS

BOND 2/0 TO GROUND GRID AT EACH CROSSING OF 4/0 GRID



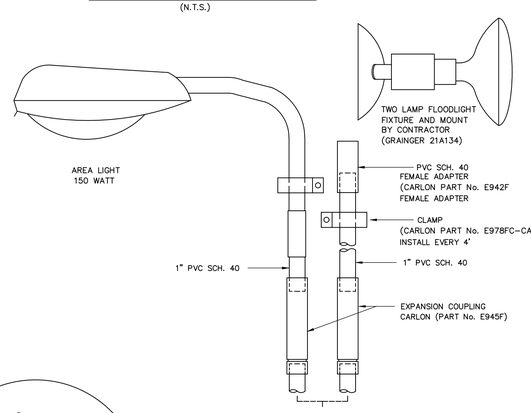
MOBILE SUBSTATION JUNCTION BOX

(1 REQUIRED)
(N.T.S.)



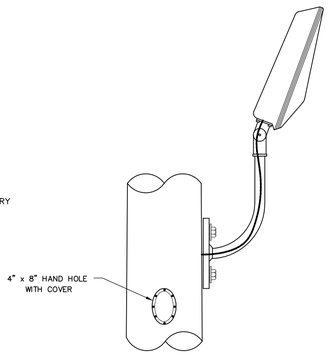
STATION SERVICE

N.T.S.



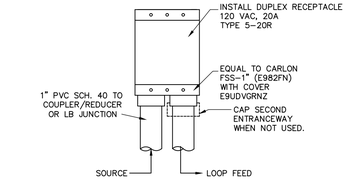
PVC SWITCH BODY FOR SECURITY LIGHTS

(N.T.S.)



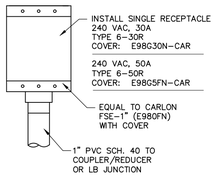
STATIC POLE FLOOD LIGHT DETAIL

(1 POLE W/2 LIGHTS)
N.T.S.



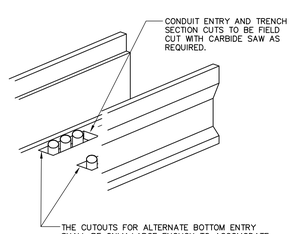
PVC OUTLET BODY FOR 120V YARD OUTLETS

(N.T.S.)



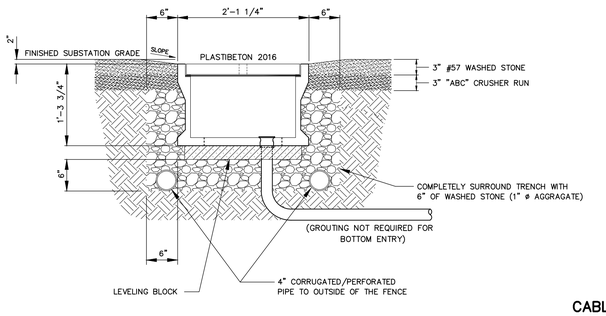
PVC OUTLET BODY FOR 240 VAC YARD OUTLETS

(N.T.S.)



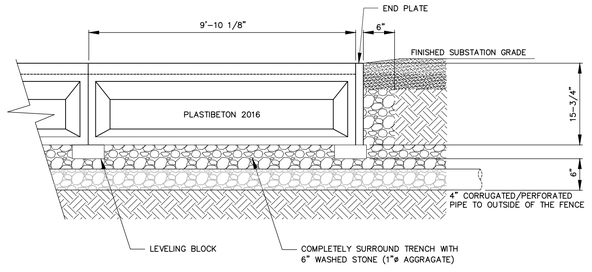
CONDUIT ENTRY

N.T.S.



CABLE TRENCH DETAIL

(N.T.S)



PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

PRELIMINARY - DO NOT USE FOR CONSTRUCTION

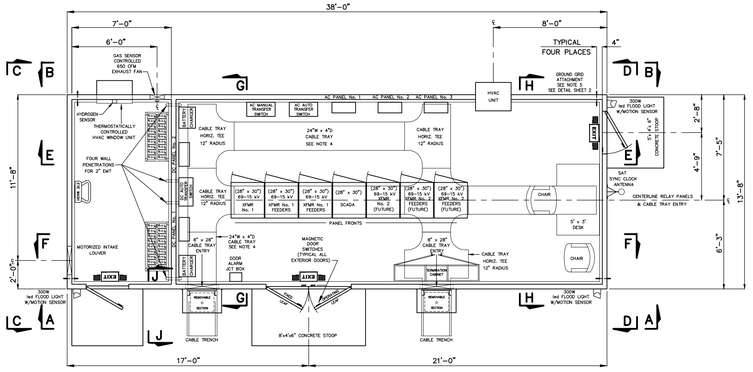
NO.	REVISIONS	ENG.	DATE
A.	ISSUED FOR BID	BWJ	05/05/22

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

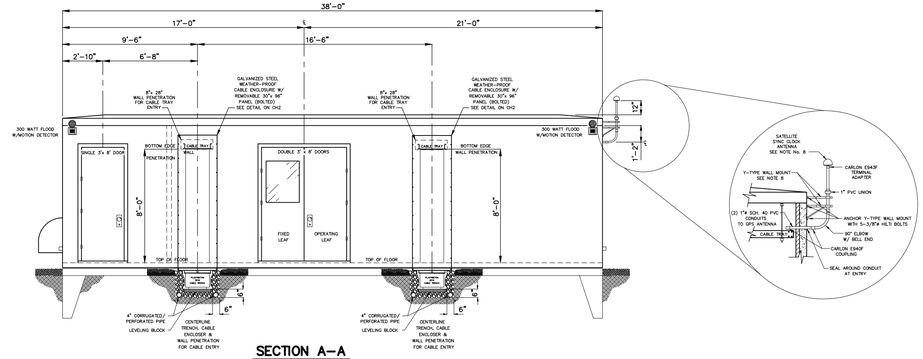
DRAWING TITLE: CONDUIT DETAILS

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	NTS
FILE NUMBER:	12513

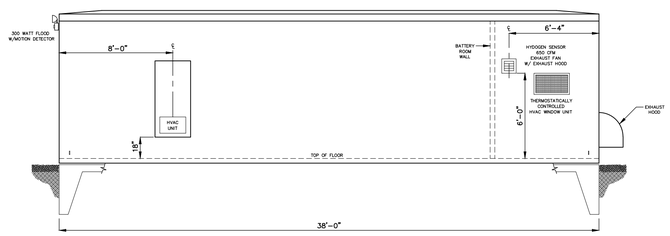
SHEET: C2



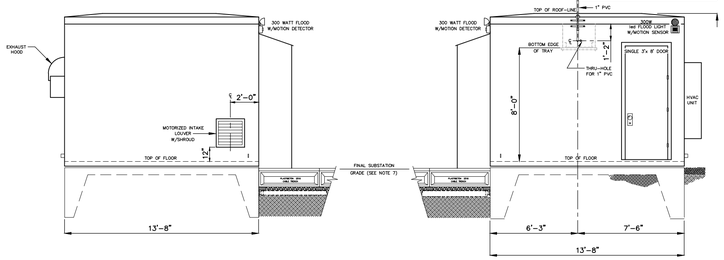
PLAN VIEW
SCALE: 1/4"=1'-0"



SECTION A–A
SCALE: 1/4"=1'-0"

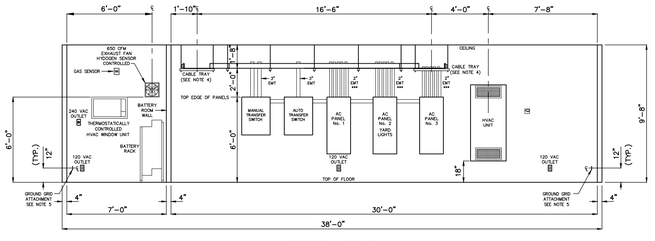


SECTION B–B
SCALE: 1/4"=1'-0"

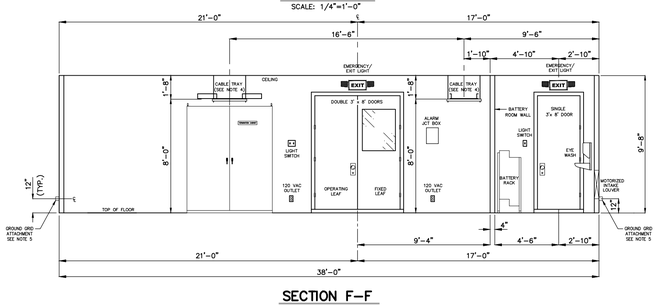


SECTION C–C
SCALE: 1/4"=1'-0"

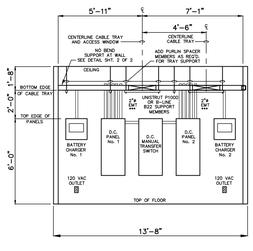
SECTION D–D
SCALE: 1/4"=1'-0"



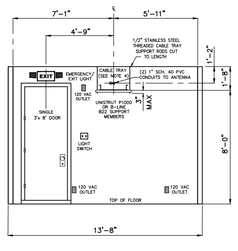
SECTION E–E
SCALE: 1/4"=1'-0"



SECTION F–F
SCALE: 1/4"=1'-0"



SECTION G–G
SCALE: 1/4"=1'-0"



SECTION H–H
SCALE: 1/4"=1'-0"

*** BUILDING CONTRACTOR TO INSTALL AS MANY 2"ø EMT CONDUITS AS WILL PRACTICALLY FIT FROM TOP OF PANELS TO CABLE TRAY. SEE EMT TERMINATION DETAIL AT CABLE TRAY SHEET CH2 OF 2
SUBSTATION CABLING TO BE RUN BY OTHERS

LEGEND

- EXIT — led EMERGENCY EXIT LIGHTING UNIT WITH SELF-CONTAINED BATTERY AND CHARGING CIRCUIT.
- SINGLE RECEPTACLE 240V, GROUNDED.
- DUPLEX RECEPTACLE 120V, 20AMP, GROUNDED.

NOTES:

1. PANELS TO BE GROUNDED (VIA CABLE TRAY) TO SUBSTATION GRID AT TWO SEPARATE LOCATIONS ON DIAGONALLY OPPOSITE CORNERS. BONDING CONDUCTOR SHALL BE 2/0 AWG STRANDED COPPER.
2. ALL ENTRANCES TO BUILDING SHALL BEAR "NO SMOKING OR OPEN FLAME" WARNING SIGNS ON EXTERIOR.
3. BUILDING CONTRACTOR SHALL FURNISH AND INSTALL CONTROL HOUSE, CABLE TRAY, SUPPORT RODS, HVAC UNITS, AND COMPLETE ELECTRICAL WIRING FOR BUILDING OUTLETS, SWITCHES, RECEPTACLES, VENTILATION AND LIGHT FIXTURES.
4. CABLE TRAY STRAIGHT SECTIONS AND FITTINGS TO BE NEMA LOAD/SPAN RATING 12C, ALUMINUM LADDER-TYPE 24" WIDE, 3" DEEP W/4" WALLS & 9" RUNG SPACING, CHALFANT SYSTEM No "2A" OR APPROVED EQUAL.
5. HOUSE TO BE ATTACHED TO STATION GROUND GRID AT INDICATED CORNERS BY USE OF 1/4" x 3" COPPER BUS BAR, INSTALLED THROUGH WALL 12" ABOVE FLOOR LEVEL, 4-HOLE NEMA SPACING, INSIDE & OUT. SEE GROUNDING PAD DETAIL ON SHEET 2 OF 2.
6. ALL LIGHTING FOR CONTROL HOUSE SHALL BE led FIXTURES. THIS INCLUDES EXIT, EMERGENCY AND OUTDOOR FLOOD LIGHTING.
7. WHERE THE FINAL SUBSTATION GRADE IS DISTURBED DURING CONSTRUCTION, A TOTAL OF AT LEAST 6" OF STONE (3" OF WASHED STONE PLUS 3" OF CRUSHER RUN) IS TO BE ADDED BACK TO ACHIEVE FINAL SUBSTATION GRADE.
8. HOUSE FABRICATOR TO PROVIDE Y-TYPE STANDOFF BRACKET WITH MOUNTING BOLTS FOR ATTACHMENT OF THE SATELLITE SYNC CLOCK ANTENNA. THE ANTENNA AND COAX CABLE TO BE PROVIDED BY THE OWNER.
9. SWITCHBOARD PANELS 5, 6, 7 ARE IDENTICAL TO SWITCHBOARD PANELS 1, 2, 3

PWC Fayetteville's HOME/TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

PRELIMINARY – DO NOT USE FOR CONSTRUCTION

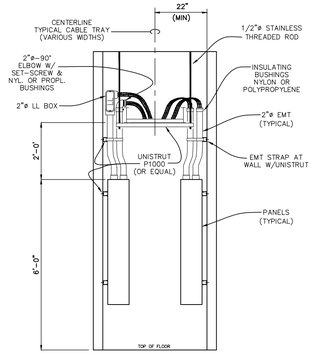
NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	BWJ	05/05/23

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: CONTROL HOUSE PLAN AND SECTIONS

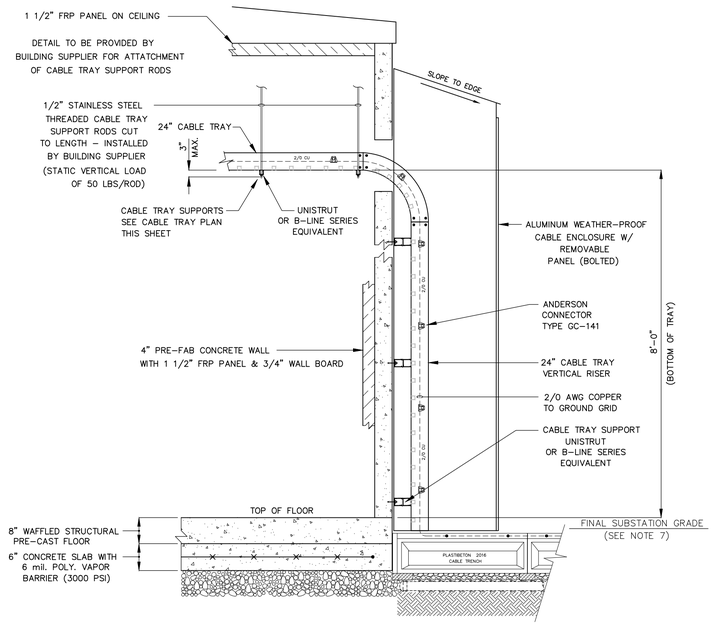
DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	3/16"=1'-0"
FILE NUMBER:	12513

SHEET: CH1



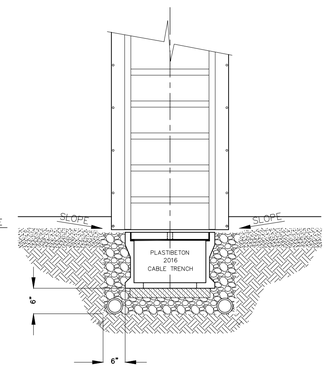
EMT TERMINATION DETAIL AT CABLE TRAY

SHOWING VARIOUS TERMINATION OPTIONS
SCALE: NONE



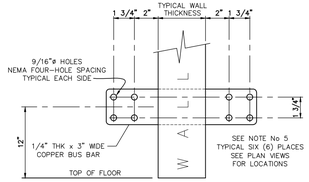
SECTION J–J

SCALE: NONE



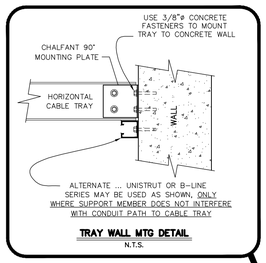
TRAY AT TRENCH

SCALE: NONE



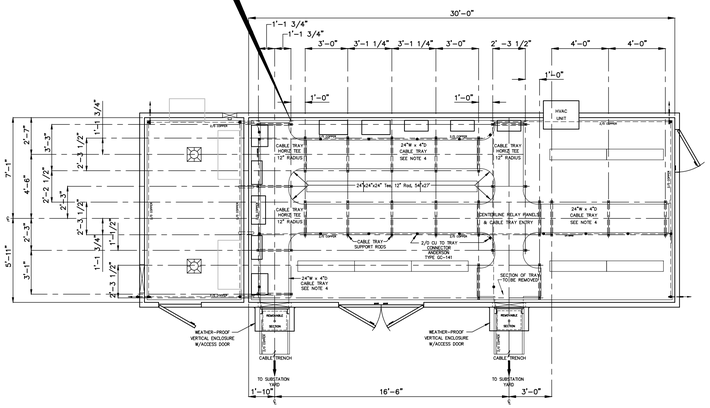
GROUNDING PAD DETAIL

SCALE: NONE



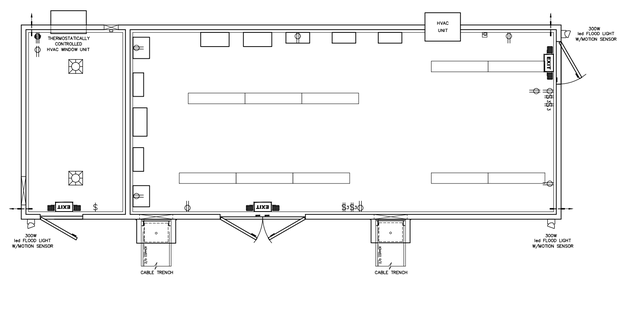
TRAY WALL MTG DETAIL

N.T.S.



CABLE TRAY PLAN

SCALE: 1/4"=1'-0"



ELECTRICAL PLAN

SCALE: 1/4"=1'-0"

ELECTRICAL LEGEND

$	SINGLE POLE TOGGLE SWITCH 20AMP, 120V.
$3	SINGLE POLE DOUBLE THROW 3-WAY TOGGLE SWITCH 20AMP, 120V.
	DUPLEX RECEPTACLE 120V, 20AMP
	SINGLE RECEPTACLE 240V, GROUNDED.
	TWO TUBE led FIXTURE 120V.
EXIT	led EMERGENCY EXIT LIGHTING UNIT WITH SELF-CONTAINED BATTERY AND CHARGING CIRCUIT.
T	THERMOSTAT
	120 V.A.C. 100 WATT EQUIVALENT led FIXTURE (EXPLOSION PROOF).
	120 V.A.C. 300 WATT EQUIVALENT led FLOOD LIGHT W/ MOTION SENSOR.
	THERMOSTAT
	MAGNETIC DOOR SWITCH

PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

PRELIMINARY – DO NOT USE FOR CONSTRUCTION

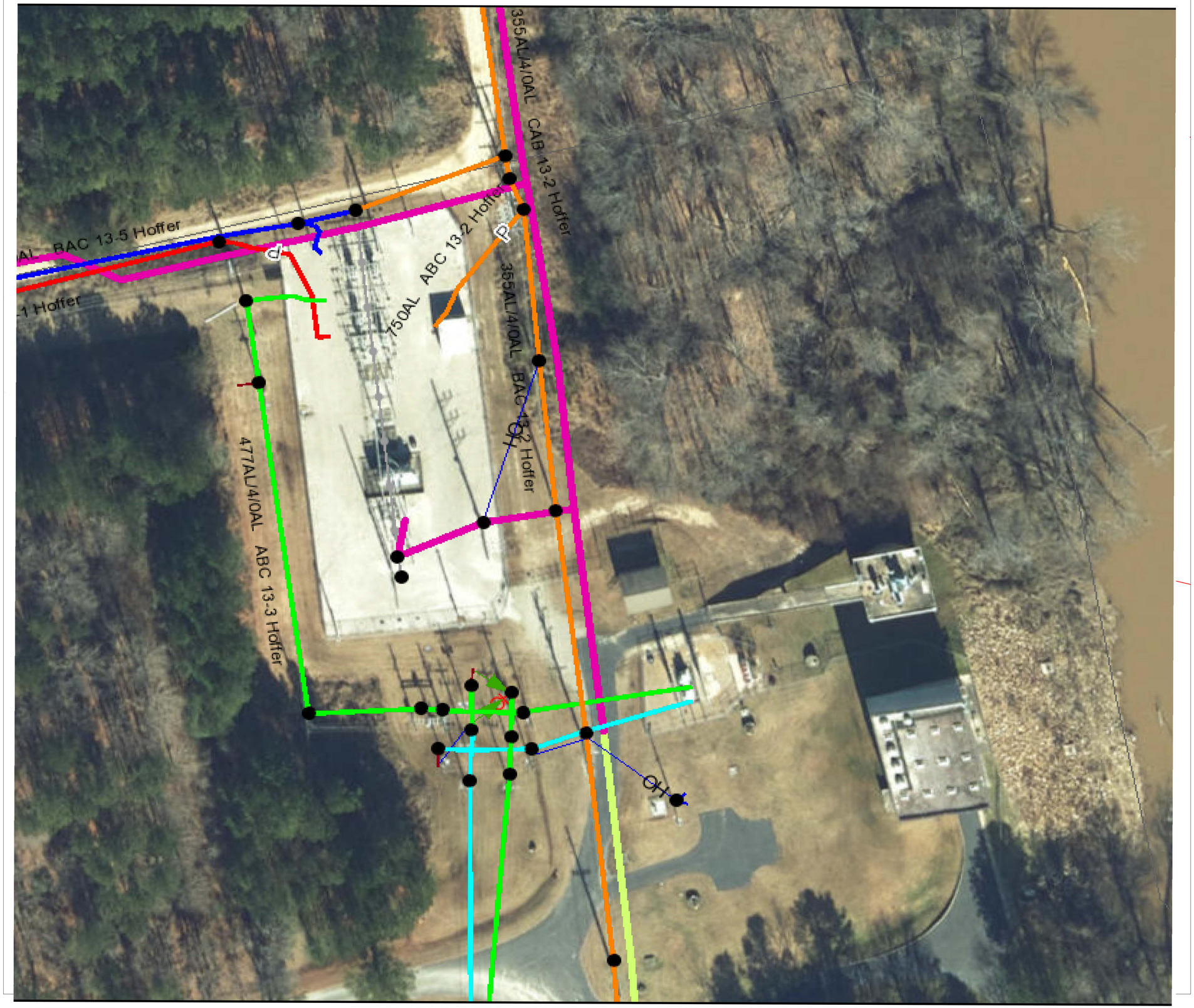
NO.	REVISIONS	DATE	ENG.
A	ISSUED FOR BID	05/05/23	BWJ

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: CONTROL HOUSE PLAN AND DETAILS

DRAWN BY:	JRT
CHECKED BY:	DAW
APPROVED BY:	MJW
DATE:	3/16/2022
SCALE:	NTS
FILE NUMBER:	12513

SHEET: CH2



LEGEND

- PROPERTY LINE
- SUBSTATION FENCE
- EDGE OF PAVEMENT/DRIVE
- EDGE OF RIGHT-OF-WAY
- OVERHEAD ELECTRICAL LINE
- CENTERLINE OF ROADSIDE DITCH
- SETBACK LINE
- PROPOSED AREA OF DISTURBANCE
- WOODS LINE
- EXISTING CONTOURS, 1FT. INTERVAL
- PROPERTY CORNER, IRON PIN
- PROPERTY CORNER, MONUMENT
- POWER POLE
- GUY AND ANCHOR COMBINATION
- WETLANDS
- PROPOSED GRAVEL DRIVE

NOTES

1. THIS DRAWING IS PRELIMINARY AND SHALL BE USED FOR SHOWING THE SUBSTATION AND ACCESS DRIVES ONLY.
2. THE ACCESS DRIVES MAY SHIFT DEPENDING ON RESULTS OF PERMITTING AND DESIGN FACTORS.

20 10 5 0 20
1"= 20'

PWC Fayetteville's HOMETOWN UTILITY

Booth & Associates, LLC
CIVIL ENGINEERING CONSULTING FIRM
5811 Glenwood Avenue
Raleigh, NC 27612
NC F-0221

PRELIMINARY - DO NOT USE FOR CONSTRUCTION

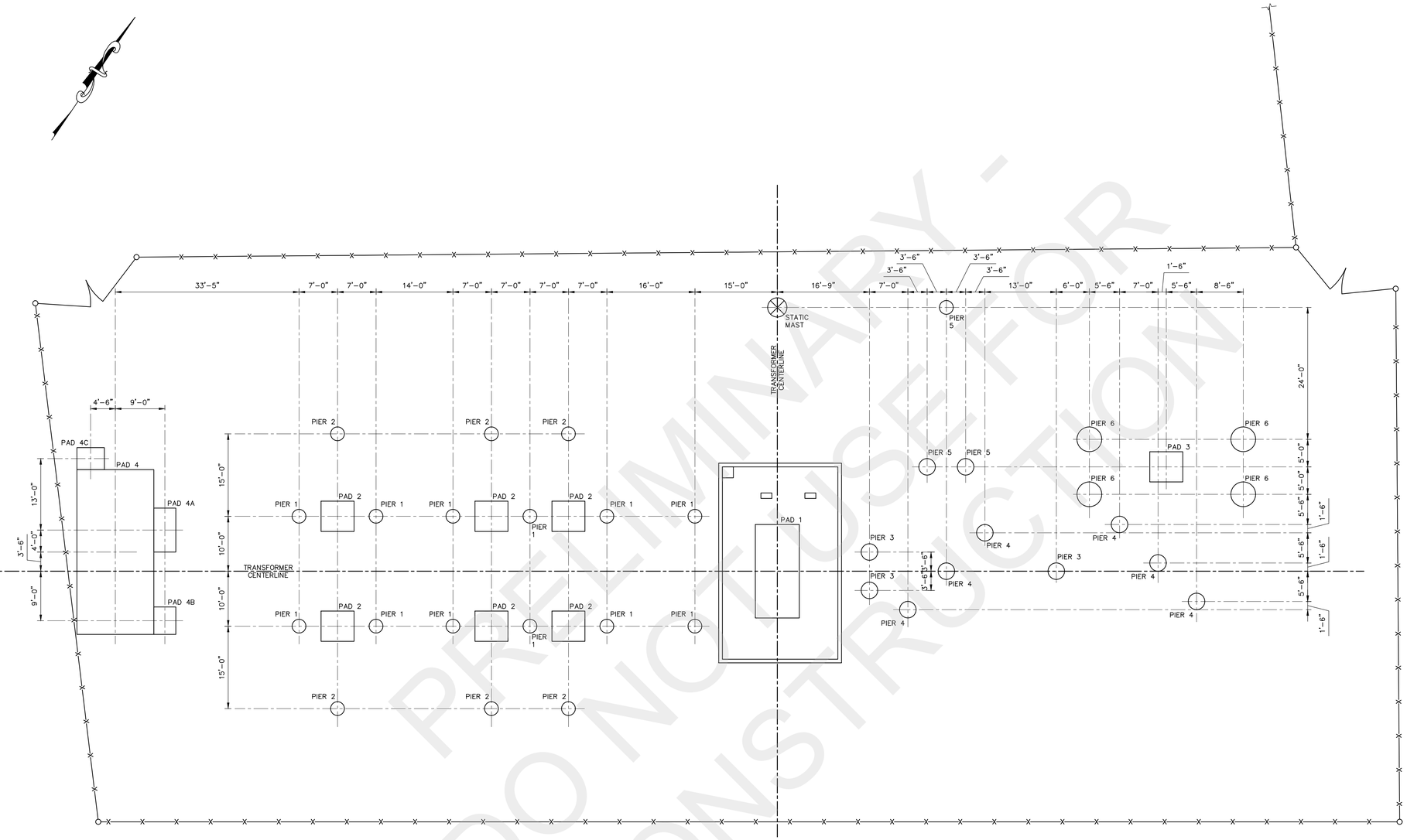
NO.	REVISIONS	ENG.	DATE
A	FOR REVIEW	MW	XX/XX/XXXX

PROJECT NAME: **PO HOFFER 69 TO 15 X 25 kV SUBSTATION**

DRAWING TITLE: **SITE PLAN**

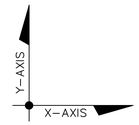
DRAWN BY:	BLP
CHECKED BY:	BDE
APPROVED BY:	MW
DATE:	02/05/2021
SCALE:	1" = 20'
FILE NUMBER:	1259224S01

SHEET: S01



FOUNDATION PLAN

SCALE: 3/32" = 1'-0"



FOUNDATION ORIENTATION

NOTES

1. THE FOUNDATION CONTRACTOR SHALL AT ALL TIMES FULLY COMPLY WITH ALL OSHA STANDARDS AS A MINIMUM, ESPECIALLY WITH REGARD TO SHORING OF ALL EXCAVATIONS. FAILURE TO COMPLY AT ALL TIMES WITH THESE STANDARDS WILL RESULT IN DISMISSAL FROM THE PROJECT.
2. THE FOUNDATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING COPIES OF OSHA STANDARDS. COPIES SHALL BE AVAILABLE ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. BRACE EXCAVATIONS AS REQUIRED TO PREVENT SETTLEMENT OF EXISTING OR ADJACENT STRUCTURES.
4. ALL FOUNDATIONS TO BE CARRIED TO FIRM UNDISTURBED EARTH OR COMPACTED FILL.
5. WASHED STONE AND STRUCTURAL FILL SHALL BE COMPACTED AS SPECIFIED IN THE FOUNDATION SPECIFICATIONS.
6. REINFORCING STEEL SHALL BE GRADE 60 ASTM A615 OR ASTM A706.
7. CONCRETE SHALL BE 4500 P.S.I. @ 28 DAYS. CONCRETE SHALL BE AIR ENTRAINED WITH AN AIR CONTENT BETWEEN FIVE AND SEVEN PERCENT (5%–7%).
8. CONCRETE SLUMP SHALL MEET REQUIREMENTS OF CONCRETE SPECIFICATIONS. THE CONTRACTOR SHALL MAKE OR HAVE MADE A MINIMUM OF ONE (1) SLUMP TEST IN ACCORDANCE WITH ASTM C 143 FOR EACH TRUCKLOAD OF CONCRETE DELIVERED.
9. CONCRETE CLEAR COVER TO REINFORCING STEEL SHALL BE TWO INCHES (2") MINIMUM UNLESS OTHERWISE NOTED.
10. ALL CONCRETE TO BE THOROUGHLY VIBRATED DURING PLACEMENT INTO FORMS TO ENSURE ALL VOIDS ARE FILLED.
11. ALL FOUNDATIONS SHALL BE CHAMFERED THREE QUARTERS OF AN INCH (3/4") AROUND ALL TOP EDGES, UNLESS SHOWN OTHERWISE.
12. TO DETERMINE ANCHOR BOLT SPACING, SEE ANCHOR BOLT PATTERN INDICATED. SEE FOUNDATION ANCHOR BOLT SUMMARY FOR DIAMETER, EMBEDMENT LENGTH, THREAD & HOOK REQUIREMENTS.
13. CAREFUL EXAMINATION OF ANCHOR BOLT ORIENTATION MUST BE MADE IN THAT AN X–AXIS & Y–AXIS SYSTEM HAS BEEN INDICATED ON BOTH FOUNDATION PLAN & DETAIL DRAWINGS TO ENSURE PROPER ORIENTATION.
14. ANCHOR BOLT SPACING & EQUIPMENT BASE PLATES SHALL BE VERIFIED TO BE CORRECT PRIOR TO POURING CONCRETE.
15. AFTER FABRICATION ALL BOLTS ARE TO BE HOT DIP GALVANIZED A MINIMUM OF TWO INCHES (2") PAST NOTED THREAD LENGTH.
16. SEE DRAWING FP1 FOR TOP OF FOUNDATION ELEVATIONS.
17. CONTRACTOR IS RESPONSIBLE TO COORDINATE INSTALLATION OF ANY CONDUITS LOCATED UNDERNEATH OR PROTRUDING THROUGH FOUNDATIONS. SEE CONDUIT PLAN AND DETAILS FOR CONDUIT LOCATIONS.
18. ALL CONDUITS, WHEN REQUIRED, ARE TO BE PLUGGED OR CAPPED DURING INITIAL CONSTRUCTION TO PREVENT CONTAMINATION.
19. A CONCRETE BONDING AGENT CONFORMING TO ASTM C1059, TYPE II, SHALL BE APPLIED TO ALL ROUGHENED SURFACES PRIOR TO PLACING FRESH CONCRETE.
20. BEFORE PLACING NEW CONCRETE AGAINST EXISTING CONCRETE THAT HAS SET, THE EXISTING CONCRETE SURFACE SHALL BE INTENTIONALLY ROUGHENED TO A FULL AMPLITUDE OF APPROXIMATELY 1/4 INCH.
21. THE CONTRACTOR SHALL PREPARE, OR HAVE PREPARED, IN ACCORDANCE WITH ASTM C–31, FIVE (5) TEST CYLINDERS FROM EACH TRUCKLOAD OF CONCRETE DELIVERED TO THE SITE. WITHIN 20–24 HOURS AFTER BEING PREPARED, THE CYLINDERS SHALL BE DELIVERED TO A QUALIFIED TESTING LABORATORY AND TESTED IN ACCORDANCE WITH THE CONCRETE SPECIFICATIONS AND ASTM C–39. TEST RESULTS ARE TO BE PROVIDED TO THE ENGINEER FOR EVALUATION AND DIRECTION OF CORRECTIVE ACTION IF NEEDED.
22. THE CONTRACTOR SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CONCRETE SPECIFICATIONS.
23. REBAR SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. CONTRACTOR SHALL ENSURE SPACING AS NOTED.
24. ALL MAIN BAR HOOKS ARE STANDARD ACI 318 HOOKS UNLESS SHOWN OTHERWISE. ALL TIES HOOKS ARE STANDARD ACI 318 TIE HOOKS UNLESS SHOWN OTHERWISE.
25. CHAIRS, SUPPORTS, WIRE TIES, SPACERS, AND ALL HARDWARE REQUIRED TO TIE AND SUPPORT REINFORCEMENT CAGES AND ASSEMBLIES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND ARE THE RESPONSIBILITY OF THE CONTRACTOR.
26. BACKFILL SHALL BE SELECT STONE (AASHTO No. 57 WASHED STONE) OR SELECT SAND (CLEAN SAND FREE OF ORGANIC DEBRIS).
27. BACKFILL MATERIAL SHALL BE PNEUMATICALLY TAMPED IN 6–INCH LIFTS.

REFERENCES

PLAN VIEW	12513 GA1
SECTIONS	12513 GA2–GA5
FOUNDATION DETAILS	12513 FD1–FD6
GROUNDING PLAN & DETAILS	12513 G1–G2
OIL CONTAINMENT PLAN & DETAILS	12513 OC1–OC3

LEGEND

NEW PIER TO BE INSTALLED

NEW PAD TO BE INSTALLED

FENCE

PWC Fayetteville's HOME/TOWN UTILITY

Booth & Associates
5811 Glenwood Avenue, Raleigh NC 27612
NC F-0221

PRELIMINARY – DO NOT USE FOR CONSTRUCTION

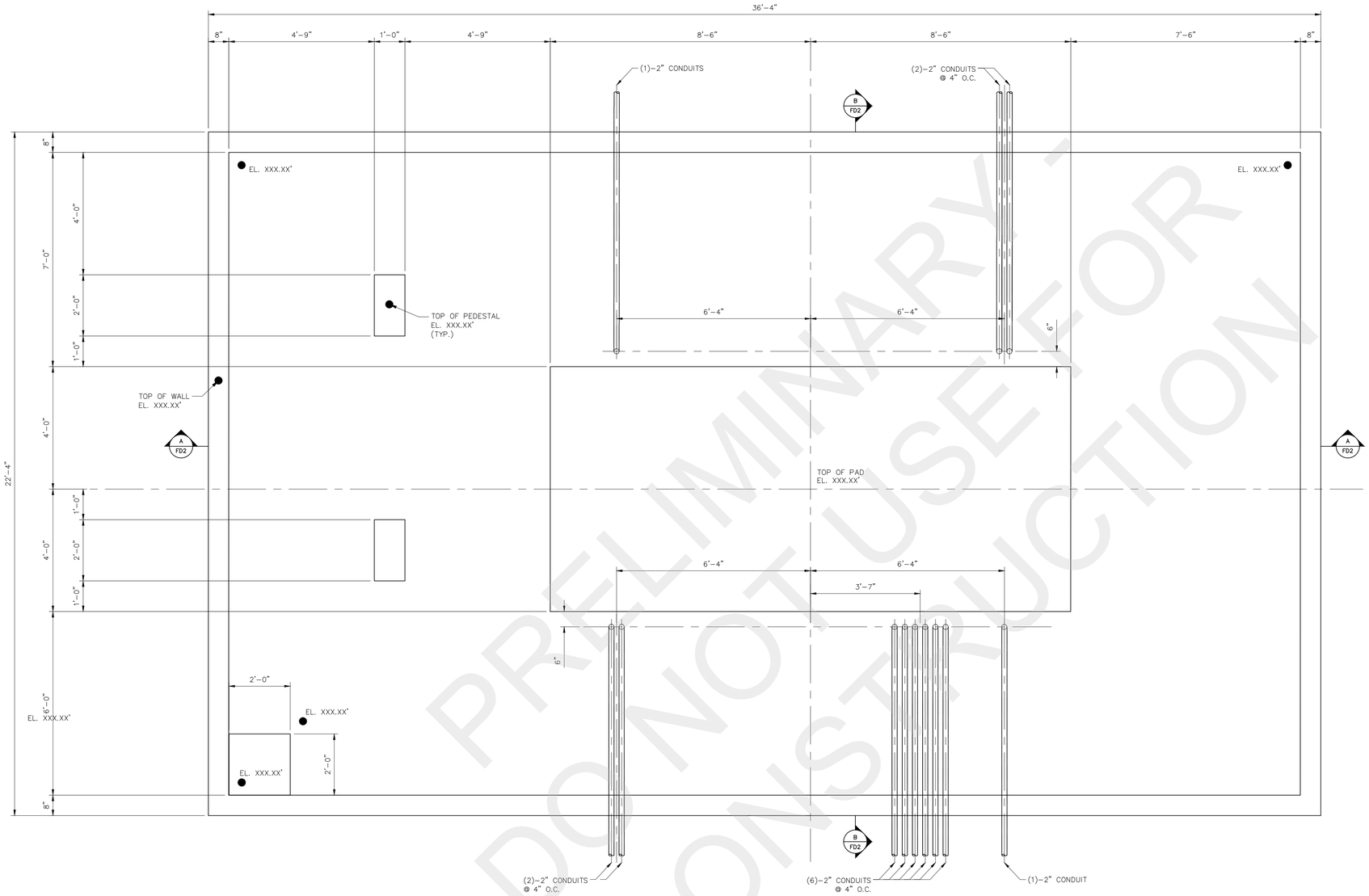
NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	RSD	10/11/2023

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: FOUNDATION PLAN

DRAWN BY:	DJD
CHECKED BY:	RSD
APPROVED BY:	RSD
DATE:	10/11/2023
SCALE:	3/32"=1'-0"
FILE NUMBER:	12513FP

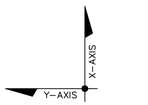
SHEET: FP1



PLAN

PAD 1
TRANSFORMER

SCALE: 1/2"=1'-0"



PAD 1 ORIENTATION

(SEE NOTES 12, 13 & 14)

NOTES

1. THE FOUNDATION CONTRACTOR SHALL AT ALL TIMES FULLY COMPLY WITH ALL OSHA STANDARDS AS A MINIMUM, ESPECIALLY WITH REGARD TO SHORING OF ALL EXCAVATIONS. FAILURE TO COMPLY AT ALL TIMES WITH THESE STANDARDS WILL RESULT IN DISMISSAL FROM THE PROJECT.
2. THE FOUNDATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING COPIES OF OSHA STANDARDS. COPIES SHALL BE AVAILABLE ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. BRACE EXCAVATIONS AS REQUIRED TO PREVENT SETTLEMENT OF EXISTING OR ADJACENT STRUCTURES.
4. ALL FOUNDATIONS TO BE CARRIED TO FIRM UNDISTURBED EARTH OR COMPACTED FILL.
5. WASHED STONE AND STRUCTURAL FILL SHALL BE COMPACTED AS SPECIFIED IN THE FOUNDATION SPECIFICATIONS.
6. REINFORCING STEEL SHALL BE GRADE 60 ASTM A615 OR ASTM A706.
7. CONCRETE SHALL BE 4500 P.S.I. @ 28 DAYS. CONCRETE SHALL BE AIR ENTRAINED WITH AN AIR CONTENT BETWEEN FIVE AND SEVEN PERCENT (5%-7%).
8. CONCRETE SLUMP SHALL MEET REQUIREMENTS OF CONCRETE SPECIFICATIONS. THE CONTRACTOR SHALL MAKE OR HAVE MADE A MINIMUM OF ONE (1) SLUMP TEST IN ACCORDANCE WITH ASTM C 143 FOR EACH TRUCKLOAD OF CONCRETE DELIVERED.
9. CONCRETE CLEAR COVER TO REINFORCING STEEL SHALL BE TWO INCHES (2") MINIMUM UNLESS OTHERWISE NOTED.
10. ALL CONCRETE TO BE THOROUGHLY VIBRATED DURING PLACEMENT INTO FORMS TO ENSURE ALL VOIDS ARE FILLED.
11. ALL FOUNDATIONS SHALL BE CHAMFERED THREE QUARTERS OF AN INCH (3/4") AROUND ALL TOP EDGES, UNLESS SHOWN OTHERWISE.
12. TO DETERMINE ANCHOR BOLT SPACING, SEE ANCHOR BOLT PATTERN INDICATED. SEE FOUNDATION ANCHOR BOLT SUMMARY FOR DIAMETER, EMBEDMENT LENGTH, THREAD & HOOK REQUIREMENTS.
13. CAREFUL EXAMINATION OF ANCHOR BOLT ORIENTATION MUST BE MADE IN THAT AN X-AXIS & Y-AXIS SYSTEM HAS BEEN INDICATED ON BOTH FOUNDATION PLAN & DETAIL DRAWINGS TO ENSURE PROPER ORIENTATION.
14. ANCHOR BOLT SPACING & EQUIPMENT BASE PLATES SHALL BE VERIFIED TO BE CORRECT PRIOR TO POURING CONCRETE.
15. AFTER FABRICATION ALL BOLTS ARE TO BE HOT DIP GALVANIZED A MINIMUM OF TWO INCHES (2") PAST NOTED THREAD LENGTH.
16. SEE DRAWING FP1 FOR TOP OF FOUNDATION ELEVATIONS.
17. CONTRACTOR IS RESPONSIBLE TO COORDINATE INSTALLATION OF ANY CONDUITS LOCATED UNDERNEATH OR PROTRUDING THROUGH FOUNDATIONS. SEE CONDUIT PLAN AND DETAILS FOR CONDUIT LOCATIONS.
18. ALL CONDUITS, WHEN REQUIRED, ARE TO BE PLUGGED OR CAPPED DURING INITIAL CONSTRUCTION TO PREVENT CONTAMINATION.
19. A CONCRETE BONDING AGENT CONFORMING TO ASTM C1059, TYPE II, SHALL BE APPLIED TO ALL ROUGHENED SURFACES PRIOR TO PLACING FRESH CONCRETE.
20. BEFORE PLACING NEW CONCRETE AGAINST EXISTING CONCRETE THAT HAS SET, THE EXISTING CONCRETE SURFACE SHALL BE INTENTIONALLY ROUGHENED TO A FULL AMPLITUDE OF APPROXIMATELY 1/4 INCH.
21. THE CONTRACTOR SHALL PREPARE, OR HAVE PREPARED, IN ACCORDANCE WITH ASTM C-31, FIVE (5) TEST CYLINDERS FROM EACH TRUCKLOAD OF CONCRETE DELIVERED TO THE SITE. WITHIN 20-24 HOURS AFTER BEING PREPARED, THE CYLINDERS SHALL BE DELIVERED TO A QUALIFIED TESTING LABORATORY AND TESTED IN ACCORDANCE WITH THE CONCRETE SPECIFICATIONS AND ASTM C-39. TEST RESULTS ARE TO BE PROVIDED TO THE ENGINEER FOR EVALUATION AND DIRECTION OF CORRECTIVE ACTION IF NEEDED.
22. THE CONTRACTOR SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CONCRETE SPECIFICATIONS.
23. REBAR SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. CONTRACTOR SHALL ENSURE SPACING AS NOTED.
24. ALL MAIN BAR HOOKS ARE STANDARD ACI 318 HOOKS UNLESS SHOWN OTHERWISE. ALL TIES HOOKS ARE STANDARD ACI 318 TIE HOOKS UNLESS SHOWN OTHERWISE.
25. CHAIRS, SUPPORTS, WIRE TIES, SPACERS, AND ALL HARDWARE REQUIRED TO TIE AND SUPPORT REINFORCEMENT CAGES AND ASSEMBLIES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND ARE THE RESPONSIBILITY OF THE CONTRACTOR.
26. BACKFILL SHALL BE SELECT STONE (AASHTO No. 57 WASHED STONE) OR SELECT SAND (CLEAN SAND FREE OF ORGANIC DEBRIS).
27. BACKFILL MATERIAL SHALL BE PNEUMATICALLY TAMPED IN 6-INCH LIFTS.

REFERENCES

FOUNDATION PLAN	12513 FP1
OIL CONTAINMENT PLAN & DETAILS	12513 OC, OC2 & OC3

PWC Fayetteville's HOME/TOWN UTILITY

Booth & Associates
2300 Rexwoods Drive, Suite 330, Raleigh NC 27607
NC F-1321

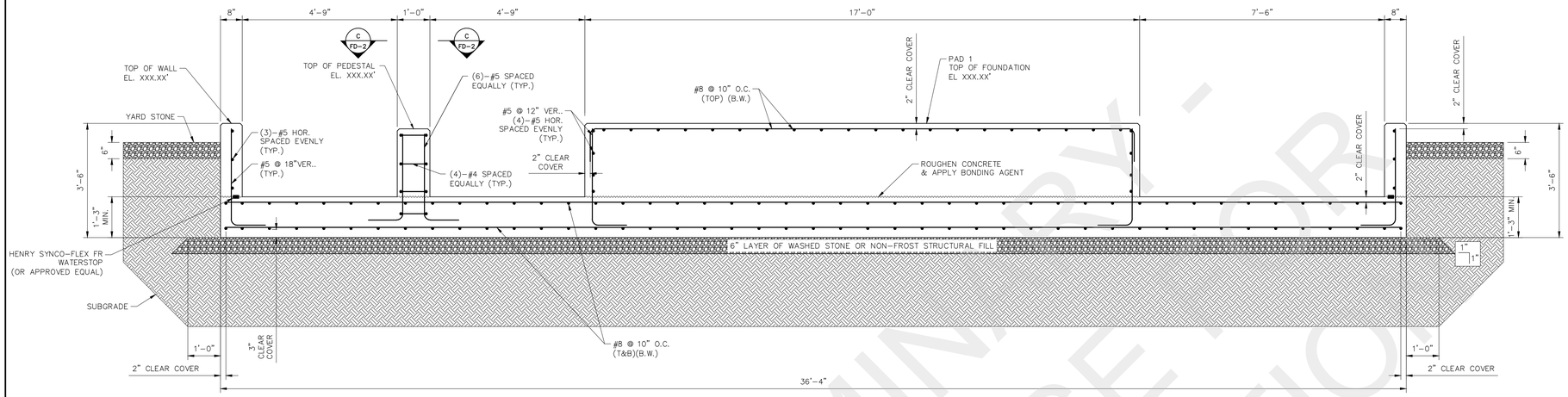
PRELIMINARY - DO NOT USE FOR CONSTRUCTION

NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	RSD	10/11/2023

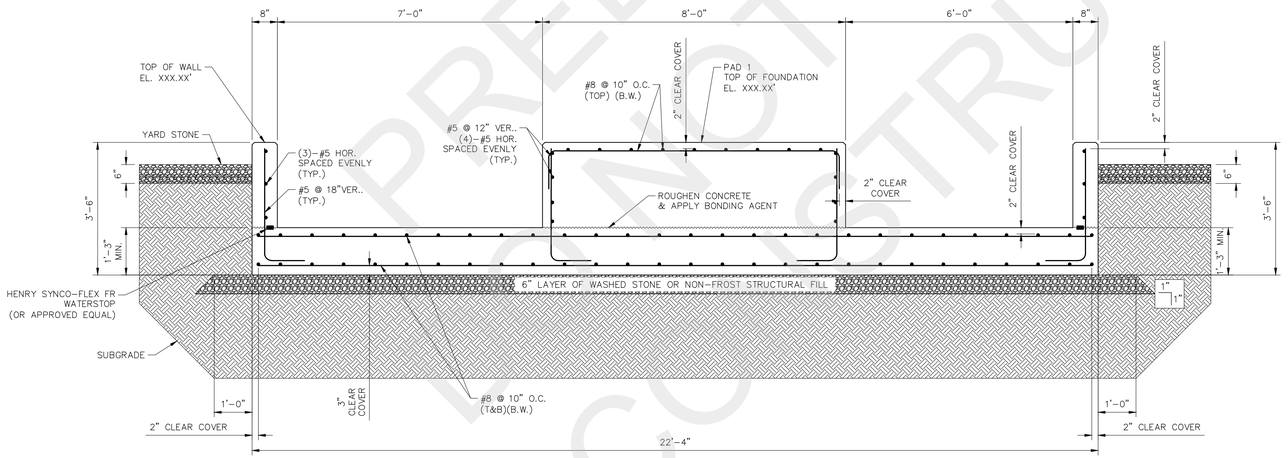
PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: FOUNDATION DETAILS

DRAWN BY:	DJD
CHECKED BY:	RSD
APPROVED BY:	RSD
DATE:	10/11/2023
SCALE:	1/2"=1'-0"
FILE NUMBER:	12513FD
SHEET:	FD1

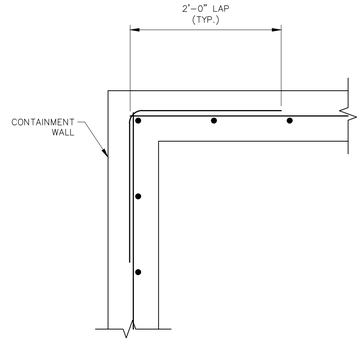


SECTION A-A



SECTION B-B

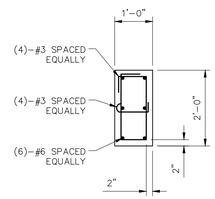
PAD 1
TRANSFORMER
SCALE: 1/2"=1'-0"



DETAIL No. 1

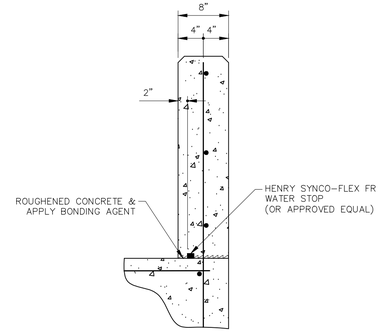
OIL CONTAINMENT CORNER
REINFORCEMENT DETAIL

(NOT TO SCALE)



VIEW C-C

SCALE: 1/2"=1'-0"



DETAIL No. 2

OIL CONTAINMENT
WATERSTOP DETAIL

(NOT TO SCALE)

PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
2300 Rexwoods Drive Suite 300, Raleigh NC 27607
NC - 1522

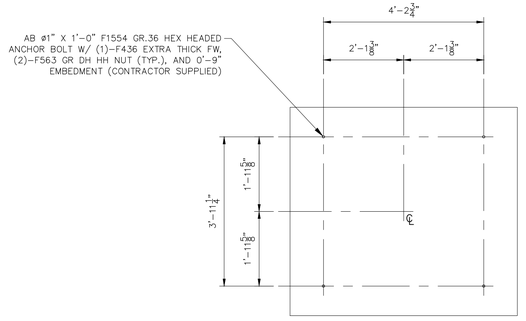
NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	RSD	10/11/2023

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

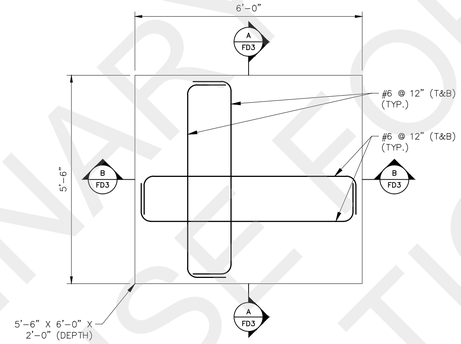
DRAWING TITLE: FOUNDATION DETAILS

DRAWN BY:	DJD
CHECKED BY:	RSD
APPROVED BY:	RSD
DATE:	10/11/2023
SCALE:	1/2"=1'-0"
FILE NUMBER:	12513FD

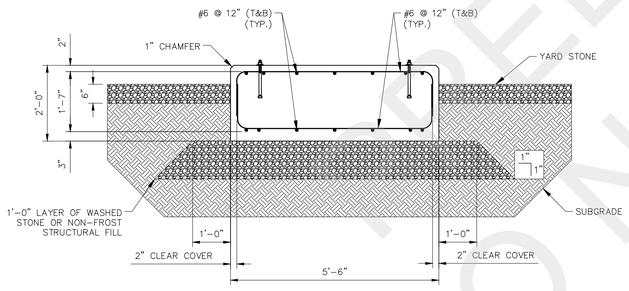
SHEET: FD2



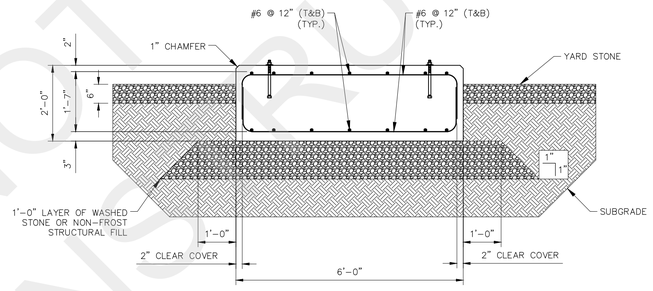
ANCHOR BOLT PLAN A



PLAN



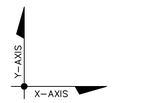
SECTION A-A



SECTION B-B

PAD 2
LS BREAKER

SCALE: 1/2"=1'-0"



PAD 2 ORIENTATION

(SEE NOTES 12, 13 & 14)

NOTES

1. THE FOUNDATION CONTRACTOR SHALL AT ALL TIMES FULLY COMPLY WITH ALL OSHA STANDARDS AS A MINIMUM, ESPECIALLY WITH REGARD TO SHORING OF ALL EXCAVATIONS. FAILURE TO COMPLY AT ALL TIMES WITH THESE STANDARDS WILL RESULT IN DISMISSAL FROM THE PROJECT.
2. THE FOUNDATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING COPIES OF OSHA STANDARDS. COPIES SHALL BE AVAILABLE ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. BRACE EXCAVATIONS AS REQUIRED TO PREVENT SETTLEMENT OF EXISTING OR ADJACENT STRUCTURES.
4. ALL FOUNDATIONS TO BE CARRIED TO FIRM UNDISTURBED EARTH OR COMPACTED FILL.
5. WASHED STONE AND STRUCTURAL FILL SHALL BE COMPACTED AS SPECIFIED IN THE FOUNDATION SPECIFICATIONS.
6. REINFORCING STEEL SHALL BE GRADE 60 ASTM A615 OR ASTM A706.
7. CONCRETE SHALL BE 4500 P.S.I. @ 28 DAYS. CONCRETE SHALL BE AIR ENTRAINED WITH AN AIR CONTENT BETWEEN FIVE AND SEVEN PERCENT (5%-7%).
8. CONCRETE SLUMP SHALL MEET REQUIREMENTS OF CONCRETE SPECIFICATIONS. THE CONTRACTOR SHALL MAKE OR HAVE MADE A MINIMUM OF ONE (1) SLUMP TEST IN ACCORDANCE WITH ASTM C 143 FOR EACH TRUCKLOAD OF CONCRETE DELIVERED.
9. CONCRETE CLEAR COVER TO REINFORCING STEEL SHALL BE TWO INCHES (2") MINIMUM UNLESS OTHERWISE NOTED.
10. ALL CONCRETE TO BE THOROUGHLY VIBRATED DURING PLACEMENT INTO FORMS TO ENSURE ALL VOIDS ARE FILLED.
11. ALL FOUNDATIONS SHALL BE CHAMFERED THREE QUARTERS OF AN INCH (3/4") AROUND ALL TOP EDGES, UNLESS SHOWN OTHERWISE.
12. TO DETERMINE ANCHOR BOLT SPACING, SEE ANCHOR BOLT PATTERN INDICATED. SEE FOUNDATION ANCHOR BOLT SUMMARY FOR DIAMETER, EMBEDMENT LENGTH, THREAD & HOOK REQUIREMENTS.
13. CAREFUL EXAMINATION OF ANCHOR BOLT ORIENTATION MUST BE MADE IN THAT AN X-AXIS & Y-AXIS SYSTEM HAS BEEN INDICATED ON BOTH FOUNDATION PLAN & DETAIL DRAWINGS TO ENSURE PROPER ORIENTATION.
14. ANCHOR BOLT SPACING & EQUIPMENT BASE PLATES SHALL BE VERIFIED TO BE CORRECT PRIOR TO POURING CONCRETE.
15. AFTER FABRICATION ALL BOLTS ARE TO BE HOT DIP GALVANIZED A MINIMUM OF TWO INCHES (2") PAST NOTED THREAD LENGTH.
16. SEE DRAWING FP1 FOR TOP OF FOUNDATION ELEVATIONS.
17. CONTRACTOR IS RESPONSIBLE TO COORDINATE INSTALLATION OF ANY CONDUITS LOCATED UNDERNEATH OR PROTRUDING THROUGH FOUNDATIONS. SEE CONDUIT PLAN AND DETAILS FOR CONDUIT LOCATIONS.
18. ALL CONDUITS, WHEN REQUIRED, ARE TO BE PLUGGED OR CAPPED DURING INITIAL CONSTRUCTION TO PREVENT CONTAMINATION.
19. A CONCRETE BONDING AGENT CONFORMING TO ASTM C1059, TYPE II, SHALL BE APPLIED TO ALL ROUGHENED SURFACES PRIOR TO PLACING FRESH CONCRETE.
20. BEFORE PLACING NEW CONCRETE AGAINST EXISTING CONCRETE THAT HAS SET, THE EXISTING CONCRETE SURFACE SHALL BE INTENTIONALLY ROUGHENED TO A FULL AMPLITUDE OF APPROXIMATELY 1/4 INCH.
21. THE CONTRACTOR SHALL PREPARE, OR HAVE PREPARED, IN ACCORDANCE WITH ASTM C-31, FIVE (5) TEST CYLINDERS FROM EACH TRUCKLOAD OF CONCRETE DELIVERED TO THE SITE. WITHIN 20-24 HOURS AFTER BEING PREPARED, THE CYLINDERS SHALL BE DELIVERED TO A QUALIFIED TESTING LABORATORY AND TESTED IN ACCORDANCE WITH THE CONCRETE SPECIFICATIONS AND ASTM C-39. TEST RESULTS ARE TO BE PROVIDED TO THE ENGINEER FOR EVALUATION AND DIRECTION OF CORRECTIVE ACTION IF NEEDED.
22. THE CONTRACTOR SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CONCRETE SPECIFICATIONS.
23. REBAR SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. CONTRACTOR SHALL ENSURE SPACING AS NOTED.
24. ALL MAIN BAR HOOKS ARE STANDARD ACI 318 HOOKS UNLESS SHOWN OTHERWISE. ALL TIES HOOKS ARE STANDARD ACI 318 TIE HOOKS UNLESS SHOWN OTHERWISE.
25. CHAIRS, SUPPORTS, WIRE TIES, SPACERS, AND ALL HARDWARE REQUIRED TO TIE AND SUPPORT REINFORCEMENT CAGES AND ASSEMBLIES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND ARE THE RESPONSIBILITY OF THE CONTRACTOR.
26. BACKFILL SHALL BE SELECT STONE (AASHTO No. 57 WASHED STONE) OR SELECT SAND (CLEAN SAND FREE OF ORGANIC DEBRIS).
27. BACKFILL MATERIAL SHALL BE PNEUMATICALLY TAMPED IN 6-INCH LIFTS.

REFERENCES

FOUNDATION PLAN 12513 FP1

PWC Fayetteville's HOME/TOWN UTILITY

Booth & Associates
2300 Rexwoods Drive, Suite 300, Raleigh NC 27607
NC F-1321

PRELIMINARY - DO NOT USE FOR CONSTRUCTION

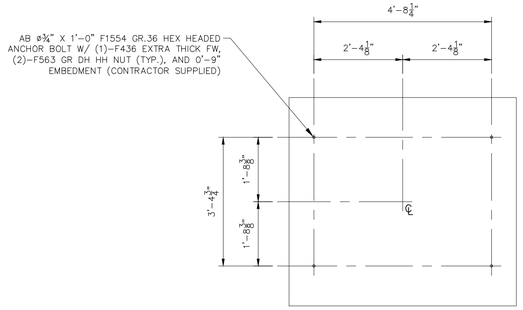
NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	RSD	10/11/2023

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

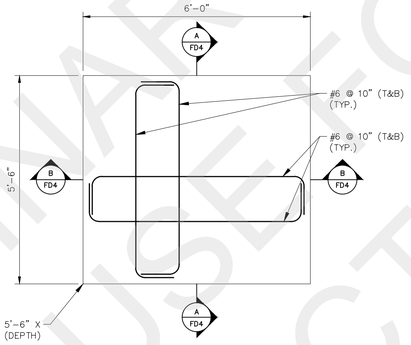
DRAWING TITLE: FOUNDATION DETAILS

DRAWN BY:	DJD
CHECKED BY:	RSD
APPROVED BY:	RSD
DATE:	10/11/2023
SCALE:	1/2"=1'-0"
FILE NUMBER:	12513FD

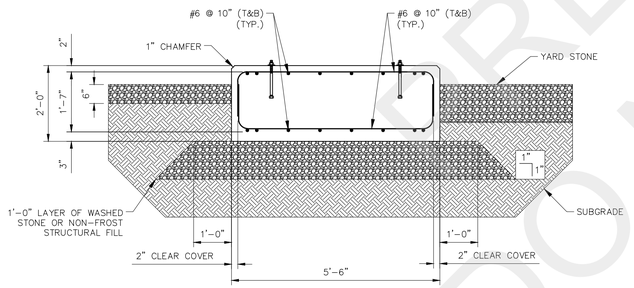
SHEET: FD3



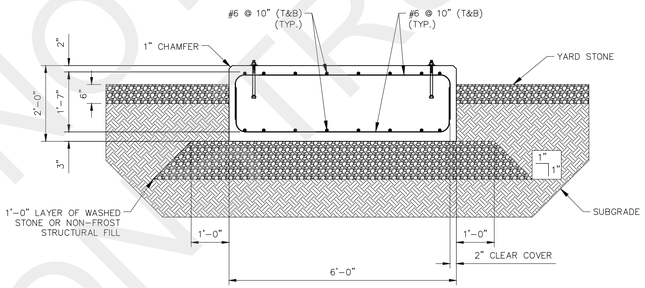
ANCHOR BOLT PLAN B



PLAN



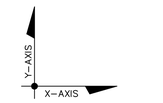
SECTION A–A



SECTION B–B

PAD 3
HS BREAKER

SCALE: 1/2"=1'-0"



PAD 3 ORIENTATION

(SEE NOTES 12, 13 & 14)

NOTES

1. THE FOUNDATION CONTRACTOR SHALL AT ALL TIMES FULLY COMPLY WITH ALL OSHA STANDARDS AS A MINIMUM, ESPECIALLY WITH REGARD TO SHORING OF ALL EXCAVATIONS. FAILURE TO COMPLY AT ALL TIMES WITH THESE STANDARDS WILL RESULT IN DISMISSAL FROM THE PROJECT.
2. THE FOUNDATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING COPIES OF OSHA STANDARDS. COPIES SHALL BE AVAILABLE ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. BRACE EXCAVATIONS AS REQUIRED TO PREVENT SETTLEMENT OF EXISTING OR ADJACENT STRUCTURES.
4. ALL FOUNDATIONS TO BE CARRIED TO FIRM UNDISTURBED EARTH OR COMPACTED FILL.
5. WASHED STONE AND STRUCTURAL FILL SHALL BE COMPACTED AS SPECIFIED IN THE FOUNDATION SPECIFICATIONS.
6. REINFORCING STEEL SHALL BE GRADE 60 ASTM A615 OR ASTM A706.
7. CONCRETE SHALL BE 4500 P.S.I. @ 28 DAYS. CONCRETE SHALL BE AIR ENTRAINED WITH AN AIR CONTENT BETWEEN FIVE AND SEVEN PERCENT (5%–7%).
8. CONCRETE SLUMP SHALL MEET REQUIREMENTS OF CONCRETE SPECIFICATIONS. THE CONTRACTOR SHALL MAKE OR HAVE MADE A MINIMUM OF ONE (1) SLUMP TEST IN ACCORDANCE WITH ASTM C 143 FOR EACH TRUCKLOAD OF CONCRETE DELIVERED.
9. CONCRETE CLEAR COVER TO REINFORCING STEEL SHALL BE TWO INCHES (2") MINIMUM UNLESS OTHERWISE NOTED.
10. ALL CONCRETE TO BE THOROUGHLY VIBRATED DURING PLACEMENT INTO FORMS TO ENSURE ALL VOIDS ARE FILLED.
11. ALL FOUNDATIONS SHALL BE CHAMFERED THREE QUARTERS OF AN INCH (3/4") AROUND ALL TOP EDGES, UNLESS SHOWN OTHERWISE.
12. TO DETERMINE ANCHOR BOLT SPACING, SEE ANCHOR BOLT PATTERN INDICATED. SEE FOUNDATION ANCHOR BOLT SUMMARY FOR DIAMETER, EMBEDMENT LENGTH, THREAD & HOOK REQUIREMENTS.
13. CAREFUL EXAMINATION OF ANCHOR BOLT ORIENTATION MUST BE MADE IN THAT AN X–AXIS & Y–AXIS SYSTEM HAS BEEN INDICATED ON BOTH FOUNDATION PLAN & DETAIL DRAWINGS TO ENSURE PROPER ORIENTATION.
14. ANCHOR BOLT SPACING & EQUIPMENT BASE PLATES SHALL BE VERIFIED TO BE CORRECT PRIOR TO POURING CONCRETE.
15. AFTER FABRICATION ALL BOLTS ARE TO BE HOT DIP GALVANIZED A MINIMUM OF TWO INCHES (2") PAST NOTED THREAD LENGTH.
16. SEE DRAWING FP1 FOR TOP OF FOUNDATION ELEVATIONS.
17. CONTRACTOR IS RESPONSIBLE TO COORDINATE INSTALLATION OF ANY CONDUITS LOCATED UNDERNEATH OR PROTRUDING THROUGH FOUNDATIONS. SEE CONDUIT PLAN AND DETAILS FOR CONDUIT LOCATIONS.
18. ALL CONDUITS, WHEN REQUIRED, ARE TO BE PLUGGED OR CAPPED DURING INITIAL CONSTRUCTION TO PREVENT CONTAMINATION.
19. A CONCRETE BONDING AGENT CONFORMING TO ASTM C1059, TYPE II, SHALL BE APPLIED TO ALL ROUGHENED SURFACES PRIOR TO PLACING FRESH CONCRETE.
20. BEFORE PLACING NEW CONCRETE AGAINST EXISTING CONCRETE THAT HAS SET, THE EXISTING CONCRETE SURFACE SHALL BE INTENTIONALLY ROUGHENED TO A FULL AMPLITUDE OF APPROXIMATELY 1/4 INCH.
21. THE CONTRACTOR SHALL PREPARE, OR HAVE PREPARED, IN ACCORDANCE WITH ASTM C–31, FIVE (5) TEST CYLINDERS FROM EACH TRUCKLOAD OF CONCRETE DELIVERED TO THE SITE. WITHIN 20–24 HOURS AFTER BEING PREPARED, THE CYLINDERS SHALL BE DELIVERED TO A QUALIFIED TESTING LABORATORY AND TESTED IN ACCORDANCE WITH THE CONCRETE SPECIFICATIONS AND ASTM C–39. TEST RESULTS ARE TO BE PROVIDED TO THE ENGINEER FOR EVALUATION AND DIRECTION OF CORRECTIVE ACTION IF NEEDED.
22. THE CONTRACTOR SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CONCRETE SPECIFICATIONS.
23. REBAR SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. CONTRACTOR SHALL ENSURE SPACING AS NOTED.
24. ALL MAIN BAR HOOKS ARE STANDARD ACI 318 HOOKS UNLESS SHOWN OTHERWISE. ALL TIES HOOKS ARE STANDARD ACI 318 TIE HOOKS UNLESS SHOWN OTHERWISE.
25. CHAIRS, SUPPORTS, WIRE TIES, SPACERS, AND ALL HARDWARE REQUIRED TO TIE AND SUPPORT REINFORCEMENT CAGES AND ASSEMBLIES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND ARE THE RESPONSIBILITY OF THE CONTRACTOR.
26. BACKFILL SHALL BE SELECT STONE (AASHTO No. 57 WASHED STONE) OR SELECT SAND (CLEAN SAND FREE OF ORGANIC DEBRIS).
27. BACKFILL MATERIAL SHALL BE PNEUMATICALLY TAMPED IN 6–INCH LIFTS.

REFERENCES

FOUNDATION PLAN 12513 FP1

PWC Fayetteville's HOME/TOWN UTILITY

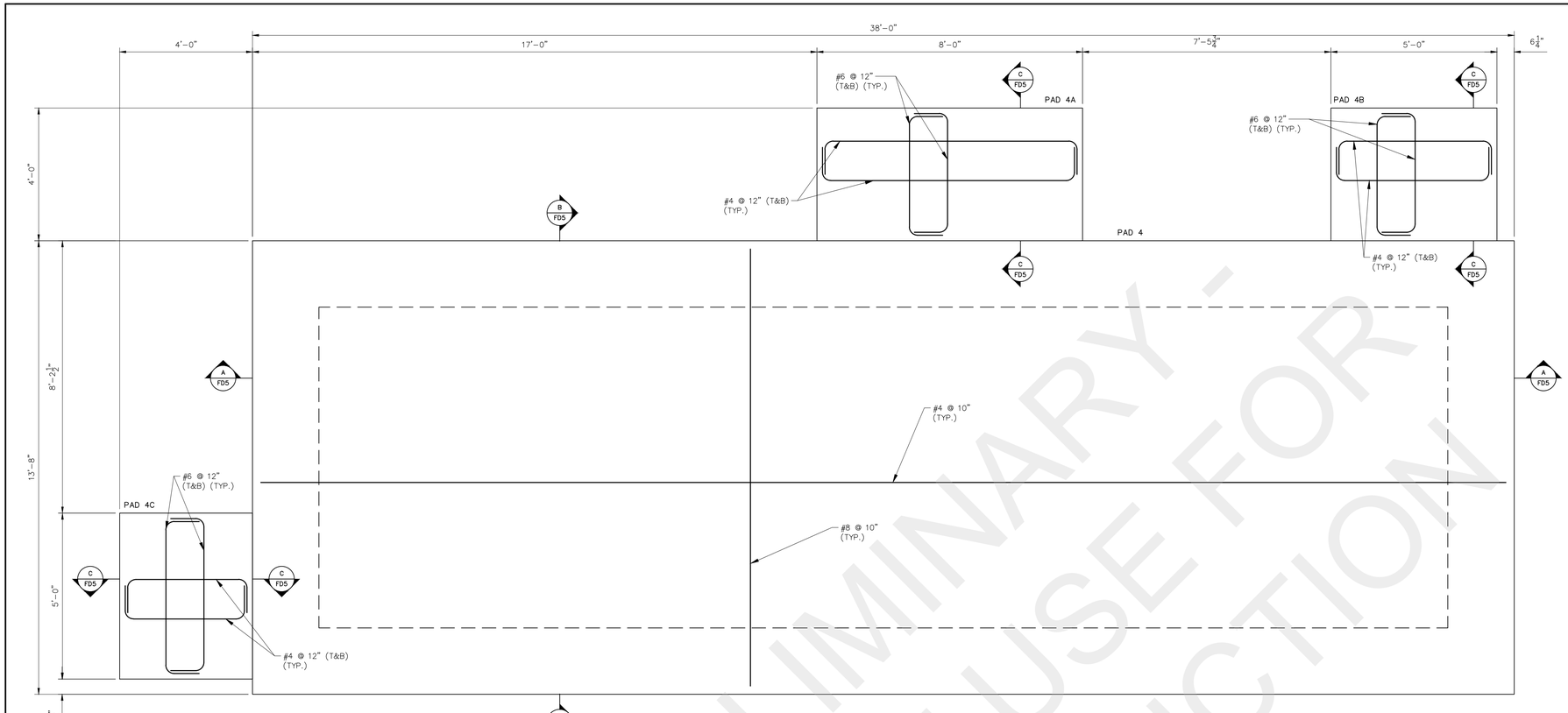
Booth & Associates
2300 Rexwoods Drive, Suite 330, Raleigh NC 27607
NC F-1321

NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	RSD	10/11/2023

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

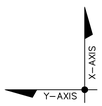
DRAWING TITLE: FOUNDATION DETAILS

DRAWN BY:	DJD
CHECKED BY:	RSD
APPROVED BY:	RSD
DATE:	10/11/2023
SCALE:	1/2"=1'-0"
FILE NUMBER:	12513FD
SHEET:	FD4



PAD 4 ORIENTATION

(SEE NOTES 12, 13 & 14)



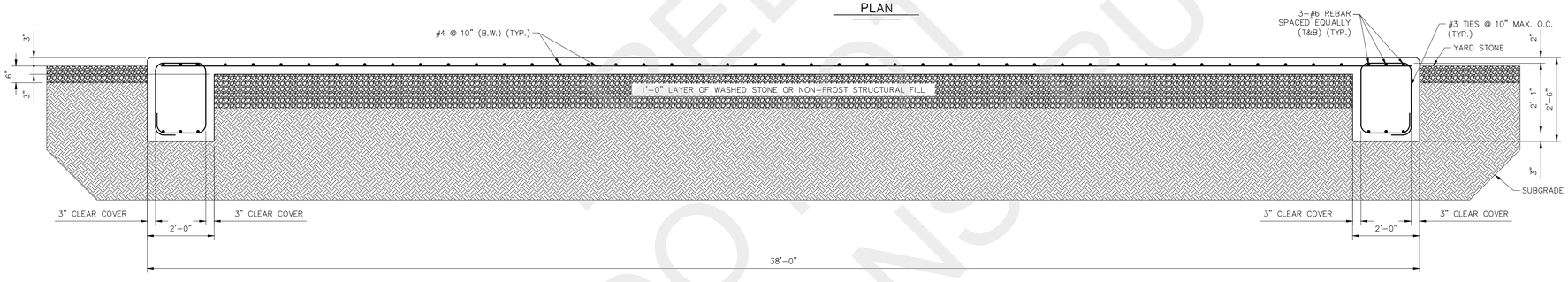
NOTES

1. THE FOUNDATION CONTRACTOR SHALL AT ALL TIMES FULLY COMPLY WITH ALL OSHA STANDARDS AS A MINIMUM, ESPECIALLY WITH REGARD TO SHORING OF ALL EXCAVATIONS. FAILURE TO COMPLY AT ALL TIMES WITH THESE STANDARDS WILL RESULT IN DISMISSAL FROM THE PROJECT.
2. THE FOUNDATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING COPIES OF OSHA STANDARDS. COPIES SHALL BE AVAILABLE ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. BRACE EXCAVATIONS AS REQUIRED TO PREVENT SETTLEMENT OF EXISTING OR ADJACENT STRUCTURES.
4. ALL FOUNDATIONS TO BE CARRIED TO FIRM UNDISTURBED EARTH OR COMPACTED FILL.
5. WASHED STONE AND STRUCTURAL FILL SHALL BE COMPACTED AS SPECIFIED IN THE FOUNDATION SPECIFICATIONS.
6. REINFORCING STEEL SHALL BE GRADE 60 ASTM A615 OR ASTM A706.
7. CONCRETE SHALL BE 4500 P.S.I. @ 28 DAYS. CONCRETE SHALL BE AIR ENTRAINED WITH AN AIR CONTENT BETWEEN FIVE AND SEVEN PERCENT (5%–7%).
8. CONCRETE SLUMP SHALL MEET REQUIREMENTS OF CONCRETE SPECIFICATIONS. THE CONTRACTOR SHALL MAKE OR HAVE MADE A MINIMUM OF ONE (1) SLUMP TEST IN ACCORDANCE WITH ASTM C 143 FOR EACH TRUCKLOAD OF CONCRETE DELIVERED.
9. CONCRETE CLEAR COVER TO REINFORCING STEEL SHALL BE TWO INCHES (2") MINIMUM UNLESS OTHERWISE NOTED.
10. ALL CONCRETE TO BE THOROUGHLY VIBRATED DURING PLACEMENT INTO FORMS TO ENSURE ALL VOIDS ARE FILLED.
11. ALL FOUNDATIONS SHALL BE CHAMFERED THREE QUARTERS OF AN INCH (3/4") AROUND ALL TOP EDGES, UNLESS SHOWN OTHERWISE.
12. TO DETERMINE ANCHOR BOLT SPACING, SEE ANCHOR BOLT PATTERN INDICATED. SEE FOUNDATION ANCHOR BOLT SUMMARY FOR DIAMETER, EMBEDMENT LENGTH, THREAD & HOOK REQUIREMENTS.
13. CAREFUL EXAMINATION OF ANCHOR BOLT ORIENTATION MUST BE MADE IN THAT AN X–AXIS & Y–AXIS SYSTEM HAS BEEN INDICATED ON BOTH FOUNDATION PLAN & DETAIL DRAWINGS TO ENSURE PROPER ORIENTATION.
14. ANCHOR BOLT SPACING & EQUIPMENT BASE PLATES SHALL BE VERIFIED TO BE CORRECT PRIOR TO POURING CONCRETE.
15. AFTER FABRICATION ALL BOLTS ARE TO BE HOT DIP GALVANIZED A MINIMUM OF TWO INCHES (2") PAST NOTED THREAD LENGTH.
16. SEE DRAWING FP1 FOR TOP OF FOUNDATION ELEVATIONS.
17. CONTRACTOR IS RESPONSIBLE TO COORDINATE INSTALLATION OF ANY CONDUITS LOCATED UNDERNEATH OR PROTRUDING THROUGH FOUNDATIONS. SEE CONDUIT PLAN AND DETAILS FOR CONDUIT LOCATIONS.
18. ALL CONDUITS, WHEN REQUIRED, ARE TO BE PLUGGED OR CAPPED DURING INITIAL CONSTRUCTION TO PREVENT CONTAMINATION.
19. A CONCRETE BONDING AGENT CONFORMING TO ASTM C1059, TYPE II, SHALL BE APPLIED TO ALL ROUGHENED SURFACES PRIOR TO PLACING FRESH CONCRETE.
20. BEFORE PLACING NEW CONCRETE AGAINST EXISTING CONCRETE THAT HAS SET, THE EXISTING CONCRETE SURFACE SHALL BE INTENTIONALLY ROUGHENED TO A FULL AMPLITUDE OF APPROXIMATELY 1/4 INCH.
21. THE CONTRACTOR SHALL PREPARE, OR HAVE PREPARED, IN ACCORDANCE WITH ASTM C–31, FIVE (5) TEST CYLINDERS FROM EACH TRUCKLOAD OF CONCRETE DELIVERED TO THE SITE. WITHIN 20–24 HOURS AFTER BEING PREPARED, THE CYLINDERS SHALL BE DELIVERED TO A QUALIFIED TESTING LABORATORY AND TESTED IN ACCORDANCE WITH THE CONCRETE SPECIFICATIONS AND ASTM C–39. TEST RESULTS ARE TO BE PROVIDED TO THE ENGINEER FOR EVALUATION AND DIRECTION OF CORRECTIVE ACTION IF NEEDED.
22. THE CONTRACTOR SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CONCRETE SPECIFICATIONS.
23. REBAR SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. CONTRACTOR SHALL ENSURE SPACING AS NOTED.
24. ALL MAIN BAR HOOKS ARE STANDARD ACI 318 HOOKS UNLESS SHOWN OTHERWISE. ALL TIES HOOKS ARE STANDARD ACI 318 TIE HOOKS UNLESS SHOWN OTHERWISE.
25. CHAIRS, SUPPORTS, WIRE TIES, SPACERS, AND ALL HARDWARE REQUIRED TO TIE AND SUPPORT REINFORCEMENT CAGES AND ASSEMBLIES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND ARE THE RESPONSIBILITY OF THE CONTRACTOR.
26. BACKFILL SHALL BE SELECT STONE (AASHTO No. 57 WASHED STONE) OR SELECT SAND (CLEAN SAND FREE OF ORGANIC DEBRIS).
27. BACKFILL MATERIAL SHALL BE PNEUMATICALLY TAMPED IN 6–INCH LIFTS.

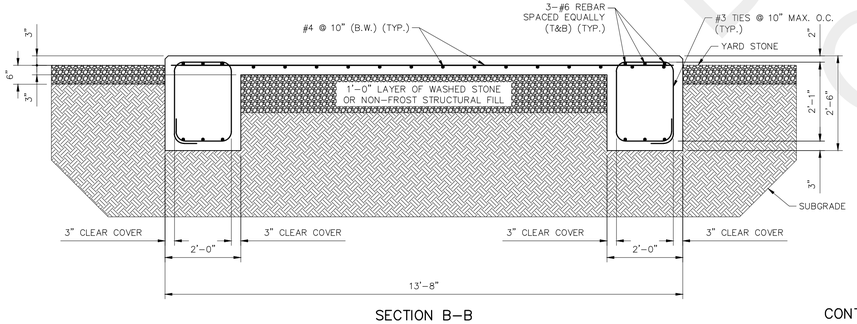
REFERENCES

FOUNDATION PLAN 12513 FP1

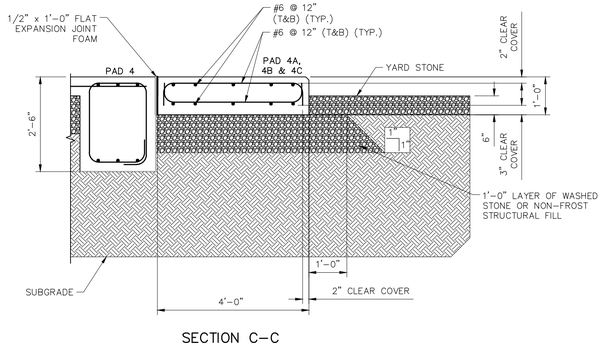
PLAN



SECTION A–A



SECTION B–B



SECTION C–C

PAD 4
CONTROL HOUSE

SCALE: 1/2"=1'–0"

PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
2300 Rexwoods Drive Suite 300, Raleigh NC 27607
NC F-1321

NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	RSD	10/11/2023

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: FOUNDATION DETAILS

DRAWN BY:	DJD
CHECKED BY:	RSD
APPROVED BY:	RSD
DATE:	10/11/2023
SCALE:	1/2"=1'–0"
FILE NUMBER:	12513FD

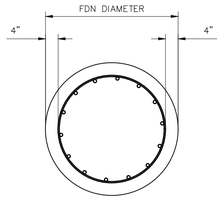
SHEET: FD5

PIER SIZE & REINFORCEMENT TABLE

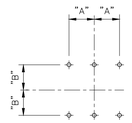
PIER NO.	DIAMETER (FT.–IN.)	TOTAL DEPTH (FT.–IN.)	VERTICAL REINFORCEMENT	TIES
1	3'–0"	13'–0"	(11)–#8	#4 @ 12"
2	3'–0"	13'–0"	(11)–#8	#4 @ 12"
3	3'–0"	11'–0"	(11)–#8	#4 @ 12"
4	3'–0"	11'–0"	(11)–#8	#4 @ 12"
5	3'–0"	13'–0"	(11)–#8	#4 @ 12"
6	4'–6"	28'–0"	(15)–#10	#4 @ 12"

PIER ANCHOR BOLT TABLE – STEEL MANUFACTURER SUPPLIED

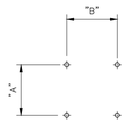
PIER NO.	ANCHOR BOLTS	PATTERN	A.B. DETAIL	DIMENSIONS (FT.–IN.) A	B	C	D	E
1	(6)–ø1 1/4" X 3'–6" F1554 GR. 55 W/ (2)–F436 EXTRA THICK FW, AND (3)–A563 GR. DH HHN	1	A	0'–6"	0'–6"	3'–6"	0'–6"	0'–6"
2	(4)–ø1 1/4" X 3'–6" F1554 GR. 55 W/ (2)–F436 EXTRA THICK FW, AND (3)–A563 GR. DH HHN	2	A	1'–0"	1'–0"	3'–6"	0'–6"	0'–6"
3	(4)–ø1" X 2'–6" F1554 GR. 55 W/ (2)–F436 EXTRA THICK FW, AND (3)–A563 GR. DH HHN	2	A	1'–0"	1'–0"	2'–6"	0'–4½"	0'–5"
4	(4)–ø1" X 2'–6" F1554 GR. 55 W/ (2)–F436 EXTRA THICK FW, AND (3)–A563 GR. DH HHN	2	A	1'–0"	1'–0"	2'–6"	0'–4½"	0'–5"
5	(4)–ø1" X 2'–6" F1554 GR. 55 W/ (2)–F436 EXTRA THICK FW, AND (3)–A563 GR. DH HHN	2	A	1'–0"	1'–0"	2'–6"	0'–4½"	0'–5"
6	(4)–ø1" X 2'–6" F1554 GR. 55 W/ (2)–F436 EXTRA THICK FW, AND (3)–A563 GR. DH HHN	2	A	1'–0"	1'–0"	2'–6"	0'–4½"	0'–5"



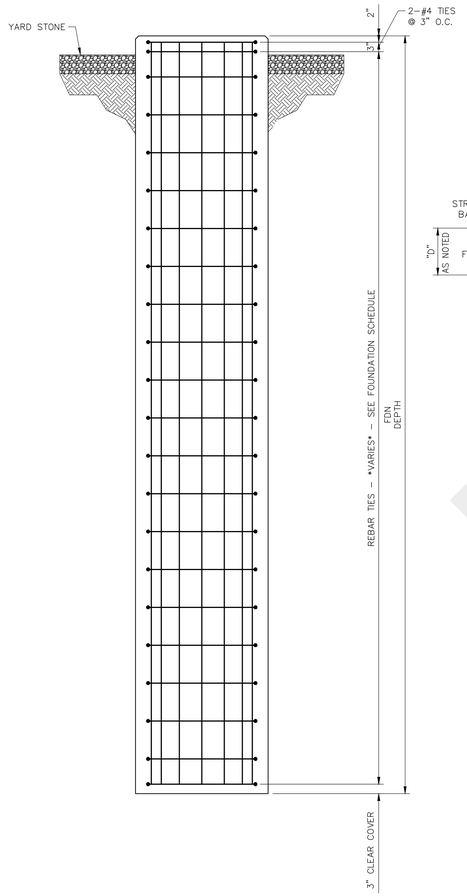
SECTION



ANCHOR BOLT PATTERN "1" (TYP.)

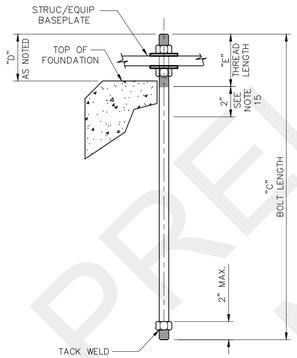


ANCHOR BOLT PATTERN "2" (TYP.)



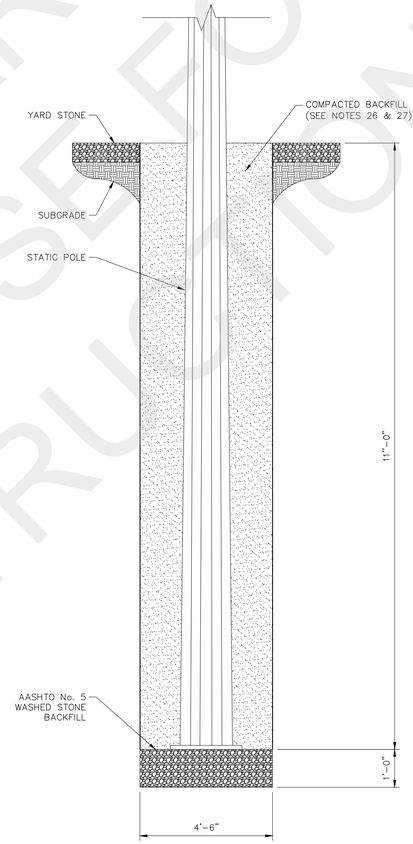
TYPICAL PIER

SCALE: 1/2"=1'–0"



ANCHOR BOLT DETAIL A

(SEE NOTES 12, 13, 14, & 15)



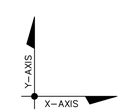
SECTION

STATIC MAST DIRECT EMBED

N.T.S

NOTES

1. THE FOUNDATION CONTRACTOR SHALL AT ALL TIMES FULLY COMPLY WITH ALL OSHA STANDARDS AS A MINIMUM, ESPECIALLY WITH REGARD TO SHORING OF ALL EXCAVATIONS. FAILURE TO COMPLY AT ALL TIMES WITH THESE STANDARDS WILL RESULT IN DISMISSAL FROM THE PROJECT.
2. THE FOUNDATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING COPIES OF OSHA STANDARDS. COPIES SHALL BE AVAILABLE ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. BRACE EXCAVATIONS AS REQUIRED TO PREVENT SETTLEMENT OF EXISTING OR ADJACENT STRUCTURES.
4. ALL FOUNDATIONS TO BE CARRIED TO FIRM UNDISTURBED EARTH OR COMPACTED FILL.
5. WASHED STONE AND STRUCTURAL FILL SHALL BE COMPACTED AS SPECIFIED IN THE FOUNDATION SPECIFICATIONS.
6. REINFORCING STEEL SHALL BE GRADE 60 ASTM A615 OR ASTM A706.
7. CONCRETE SHALL BE 4500 P.S.I. @ 28 DAYS. CONCRETE SHALL BE AIR ENTRAINED WITH AN AIR CONTENT BETWEEN FIVE AND SEVEN PERCENT (5%–7%).
8. CONCRETE SLUMP SHALL MEET REQUIREMENTS OF CONCRETE SPECIFICATIONS. THE CONTRACTOR SHALL MAKE OR HAVE MADE A MINIMUM OF ONE (1) SLUMP TEST IN ACCORDANCE WITH ASTM C 143 FOR EACH TRUCKLOAD OF CONCRETE DELIVERED.
9. CONCRETE CLEAR COVER TO REINFORCING STEEL SHALL BE TWO INCHES (2") MINIMUM UNLESS OTHERWISE NOTED.
10. ALL CONCRETE TO BE THOROUGHLY VIBRATED DURING PLACEMENT INTO FORMS TO ENSURE ALL VOIDS ARE FILLED.
11. ALL FOUNDATIONS SHALL BE CHAMFERED THREE QUARTERS OF AN INCH (3/4") AROUND ALL TOP EDGES, UNLESS SHOWN OTHERWISE.
12. TO DETERMINE ANCHOR BOLT SPACING, SEE ANCHOR BOLT PATTERN INDICATED. SEE FOUNDATION ANCHOR BOLT SUMMARY FOR DIAMETER, EMBEDMENT LENGTH, THREAD & HOOK REQUIREMENTS.
13. CAREFUL EXAMINATION OF ANCHOR BOLT ORIENTATION MUST BE MADE IN THAT AN X–AXIS & Y–AXIS SYSTEM HAS BEEN INDICATED ON BOTH FOUNDATION PLAN & DETAIL DRAWINGS TO ENSURE PROPER ORIENTATION.
14. ANCHOR BOLT SPACING & EQUIPMENT BASE PLATES SHALL BE VERIFIED TO BE CORRECT PRIOR TO POURING CONCRETE.
15. AFTER FABRICATION ALL BOLTS ARE TO BE HOT DIP GALVANIZED A MINIMUM OF TWO INCHES (2") PAST NOTED THREAD LENGTH.
16. SEE DRAWING FP1 FOR TOP OF FOUNDATION ELEVATIONS.
17. CONTRACTOR IS RESPONSIBLE TO COORDINATE INSTALLATION OF ANY CONDUITS LOCATED UNDERNEATH OR PROTRUDING THROUGH FOUNDATIONS. SEE CONDUIT PLAN AND DETAILS FOR CONDUIT LOCATIONS.
18. ALL CONDUITS, WHEN REQUIRED, ARE TO BE PLUGGED OR CAPPED DURING INITIAL CONSTRUCTION TO PREVENT CONTAMINATION.
19. A CONCRETE BONDING AGENT CONFORMING TO ASTM C1059, TYPE II, SHALL BE APPLIED TO ALL ROUGHENED SURFACES PRIOR TO PLACING FRESH CONCRETE.
20. BEFORE PLACING NEW CONCRETE AGAINST EXISTING CONCRETE THAT HAS SET, THE EXISTING CONCRETE SURFACE SHALL BE INTENTIONALLY ROUGHENED TO A FULL AMPLITUDE OF APPROXIMATELY 1/4 INCH.
21. THE CONTRACTOR SHALL PREPARE, OR HAVE PREPARED, IN ACCORDANCE WITH ASTM C–31, FIVE (5) TEST CYLINDERS FROM EACH TRUCKLOAD OF CONCRETE DELIVERED TO THE SITE. WITHIN 20–24 HOURS AFTER BEING PREPARED, THE CYLINDERS SHALL BE DELIVERED TO A QUALIFIED TESTING LABORATORY AND TESTED IN ACCORDANCE WITH THE CONCRETE SPECIFICATIONS AND ASTM C–39. TEST RESULTS ARE TO BE PROVIDED TO THE ENGINEER FOR EVALUATION AND DIRECTION OF CORRECTIVE ACTION IF NEEDED.
22. THE CONTRACTOR SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CONCRETE SPECIFICATIONS.
23. REBAR SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. CONTRACTOR SHALL ENSURE SPACING AS NOTED.
24. ALL MAIN BAR HOOKS ARE STANDARD ACI 318 HOOKS UNLESS SHOWN OTHERWISE. ALL TIES HOOKS ARE STANDARD ACI 318 TIE HOOKS UNLESS SHOWN OTHERWISE.
25. CHAIRS, SUPPORTS, WIRE TIES, SPACERS, AND ALL HARDWARE REQUIRED TO TIE AND SUPPORT REINFORCEMENT CAGES AND ASSEMBLIES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND ARE THE RESPONSIBILITY OF THE CONTRACTOR.
26. BACKFILL SHALL BE SELECT STONE (AASHTO No. 57 WASHED STONE) OR SELECT SAND (CLEAN SAND FREE OF ORGANIC DEBRIS).
27. BACKFILL MATERIAL SHALL BE PNEUMATICALLY TAMPED IN 6–INCH LIFTS.



PIERS 1–6 ORIENTATION

(SEE NOTES 12, 13 & 14)

REFERENCES

FOUNDATION PLAN 12513 FP1

PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
2300 Rexwoods Drive Suite 300, Raleigh NC 27607
NC FIRM #1021

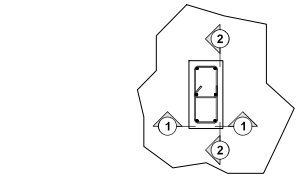
NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	RSD	10/11/2023

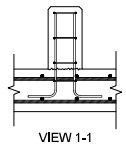
PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

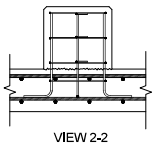
DRAWING TITLE: FOUNDATION DETAILS

DRAWN BY:	DJD
CHECKED BY:	RSD
APPROVED BY:	RSD
DATE:	10/11/2023
SCALE:	AS NOTED
FILE NUMBER:	12513FD

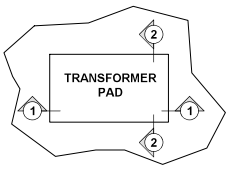
SHEET: FD6

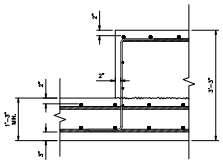


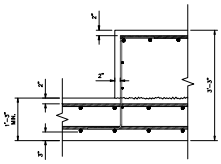




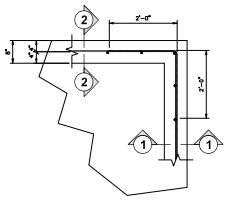
TYPICAL PEDESTAL
REBAR DETAIL

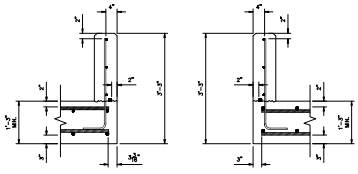




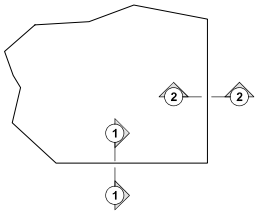


TYPICAL TRANSFORMER
REBAR DETAIL





TYPICAL OC WALL
REBAR DETAIL



TYPICAL PAD
REBAR DETAIL

NORTH CAROLINA PROFESSIONAL SEAL 040262 ENGINEER MARK T. BOOTH
8/23/2021

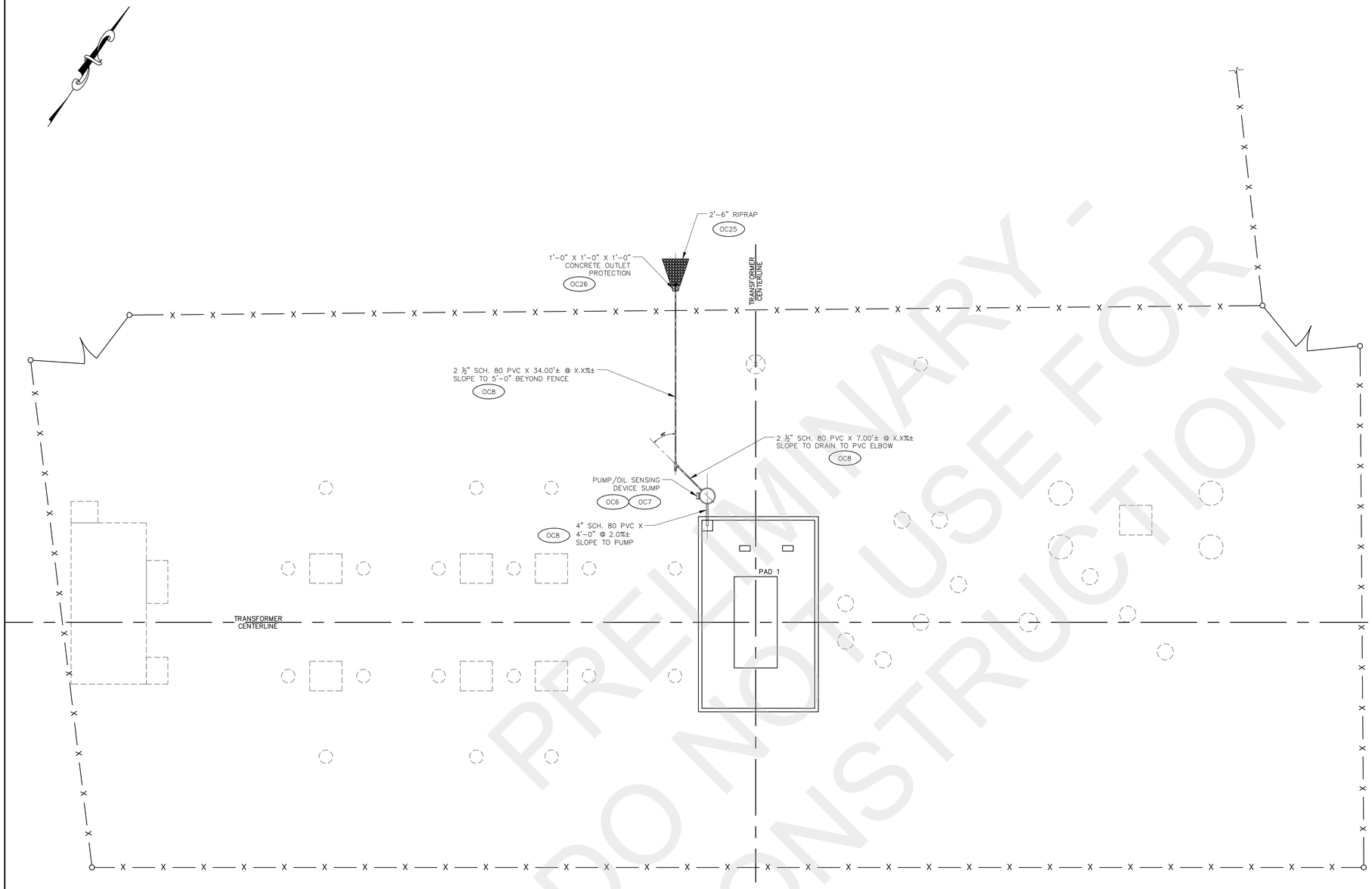
NO.	REVISIONS	DATE
0	ISSUED FOR CONSTRUCTION	08/02/21
0		08/23/21

PWC OF THE CITY OF FAYETTEVILLE
FAYETTEVILLE, NORTH CAROLINA

P.O. HOFFER
69 TO 15 X 25kV SUBSTATION
FOUNDATION DETAILS

Booth & Associates, LLC

DWN. RLT | CHD. MK | APPD. MJM | SCALE 1/2"=1'-0" | PLOTS 1:1
DATE: 08/02/21
DWG. NO. FD7
12502
12502FD (ID 101881).DWG

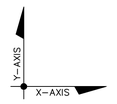


OIL CONTAINMENT PLAN

SCALE: 3/32" = 1'-0"

NOTES:

1. THE CONTRACTOR SHALL AT ALL TIMES FULLY COMPLY WITH ALL OSHA STANDARDS AS A MINIMUM, ESPECIALLY WITH REGARD TO SHORING OF ALL EXCAVATIONS. THE ENGINEER OR OWNER WILL IMMEDIATELY HALT CONSTRUCTION ACTIVITIES IF THE CONTRACTOR DOES NOT COMPLY WITH THESE STANDARDS. FAILURE TO IMMEDIATELY COMPLY WITH THESE STANDARDS WILL RESULT IN DISMISSAL FROM THE PROJECT.
2. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING COPIES OF OSHA STANDARDS. COPIES SHALL BE AVAILABLE ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. THE OIL CONTAINMENT SYSTEM HAS BEEN DESIGNED TO CONTAIN THE ENTIRE VOLUME OF OIL IN THE SINGLE LARGEST CONTAINER, PLUS RAINFALL BASED ON LOCAL WEATHER RECORDS. HOWEVER, THE OIL CONTAINMENT IS NOT GUARANTEED IN THE EVENT OF AN EXPLOSIVE TYPE FAILURE WHERE OIL IS SPRAYED BEYOND THE PERIMETER OF THE CONTAINMENT BASIN.
4. ALL STRUCTURAL CONCRETE SHALL BE SUPPORTED ON FIRM UNDISTURBED EARTH OR COMPACTED FILL.
5. AFTER INSTALLATION, THE OIL CONTAINMENT SYSTEM SHOULD BE CHECKED REGULARLY BY THE OWNER TO ENSURE ALL EQUIPMENT IS IN PROPER WORKING ORDER.
6. THE OIL SENSING DEVICE SHOULD BE TESTED REGULARLY BY THE OWNER ACCORDING TO MANUFACTURER'S INSTRUCTIONS AND REPLACED IF NECESSARY.
7. SEE DRAWING OC2 AND OC3 FOR TRANSFORMER PAD ELEVATIONS.
8. ALL LINES SHALL HAVE MINIMUM SLOPES AS INDICATED BY INVERT ELEVATIONS SHOWN ON DRAWING OC2 OF 3.
9. OIL CONTAINMENT SYSTEM DESIGN SHOWN IS IN ACCORDANCE WITH RECOMMENDATIONS OF EPA 40 CFR 112.
10. ESTABLISH POSITIVE DRAIN TO OUTLETS. NOTE ELEVATIONS SHOWN IN PITS. SEE DRAWING OC2 AND OC3.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATIONS AND DEPTHS OF ANY EXISTING UNDERGROUND DUCT BANKS, CABLE TRENCHES, CONDUITS, CABLES ETC. TO ENSURE THAT THE EXISTING LOCATIONS AND DEPTHS DO NOT INTERFERE WITH THE INSTALLATION OF THE OIL CONTAINMENT SYSTEM.
12. ALL CONTROL/ELECTRICAL CONDUITS ARE TO BE SCHEDULE 40 PVC. SIZE AS SHOWN ON DRAWING.
13. CONTRACTOR IS RESPONSIBLE TO COORDINATE INSTALLATION OF ANY CONDUITS LOCATED UNDERNEATH OR PROTRUDING THROUGH FOUNDATIONS. SEE CONDUIT PLAN AND DETAILS FOR CONDUIT LOCATIONS.
14. THE CONTRACTOR SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CONCRETE SPECIFICATIONS.
15. TO AVOID CONFLICTS FROM THE OTHER CONDUITS AROUND THE SUBSTATION THE MAXIMUM DEPTH AT ANY POINT OF THE OIL CONTAINMENT DRAIN PIPES IS NOT TO EXCEED 3'-0" BELOW FINAL GRADE UNLESS OTHERWISE NOTED.



FOUNDATION ORIENTATION

LEGEND

- NEW FOUNDATIONS TO BE INSTALLED
- OIL CONTAINMENT AND TRANSFORMER PAD TO BE INSTALLED
- — X — FENCE

REFERENCES

PLAN VIEW	12513 GA1
SECTIONS	12513 GA2–GA5
FOUNDATION PLAN	12513 FP1
FOUNDATION DETAILS	12513 FD1–FD6
GROUNDING PLAN & DETAILS	12513 G1–G2
OIL CONTAINMENT SECTIONS	12513 OC2
OIL CONTAINMENT DETAILS	12513 OC3

PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
2300 Rexwoods Drive Suite 300, Raleigh NC 27607
NC F-1321

PRELIMINARY – DO NOT USE FOR CONSTRUCTION

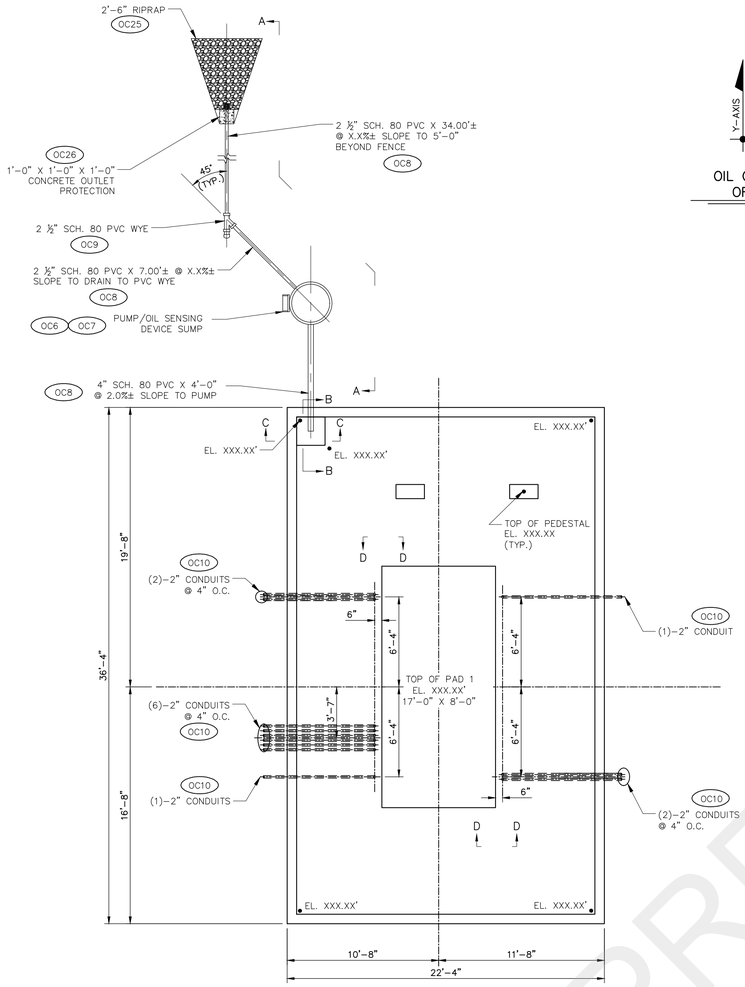
NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	RSD	10/11/2023

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: OIL CONTAINMENT PLAN

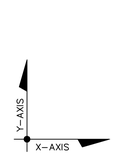
DRAWN BY:	DJD
CHECKED BY:	RSD
APPROVED BY:	RSD
DATE:	10/11/2023
SCALE:	3/32"=1'-0"
FILE NUMBER:	125130C

SHEET: OC1

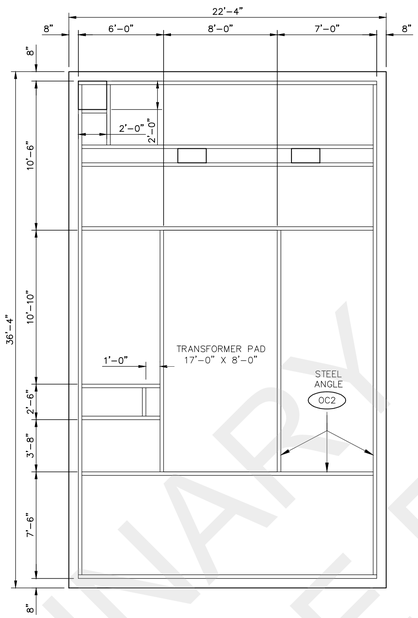


PAD 1 PLAN VIEW

SCALE: 3/16"=1'-0"

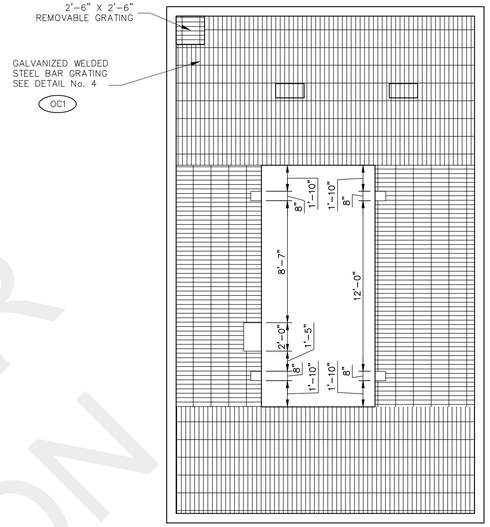


OIL CONTAINMENT ORIENTATION



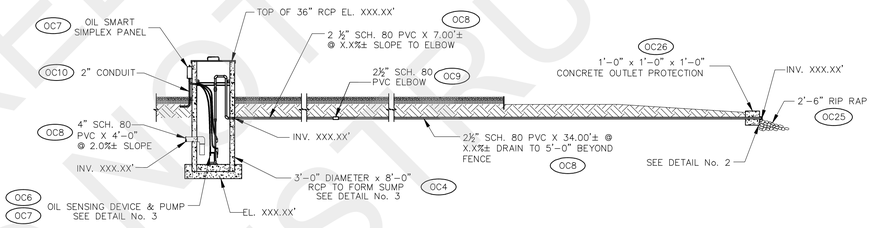
STEEL ANGLE LAYOUT

SCALE: 3/16"=1'-0"



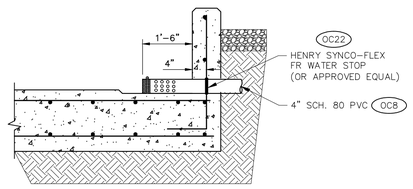
GRATING LAYOUT

SCALE: 3/16"=1'-0"



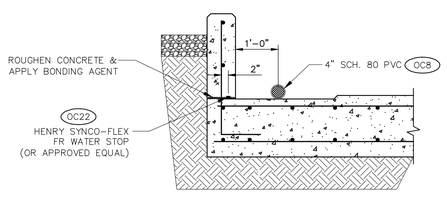
SECTION A–A

(NOT TO SCALE)



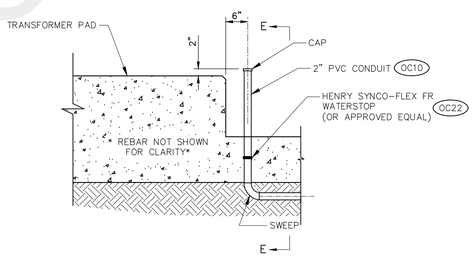
SECTION B–B

(NOT TO SCALE)



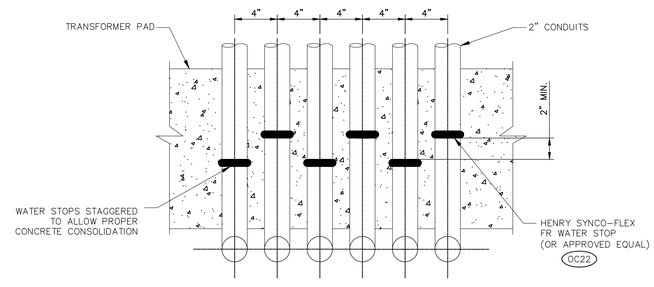
SECTION C–C

(NOT TO SCALE)



SECTION D–D

(NOT TO SCALE)



SECTION E–E

(NOT TO SCALE)

PWC Fayetteville's HOME TOWN UTILITY

Booth & Associates
2300 Rexwoods Drive Suite 300, Raleigh NC 27607
NC: 1520

PRELIMINARY – DO NOT USE FOR CONSTRUCTION

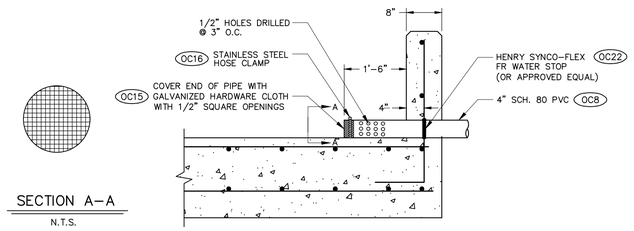
NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	RSD	10/11/2023

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

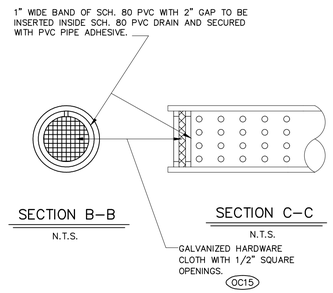
DRAWING TITLE: OIL CONTAINMENT SECTIONS

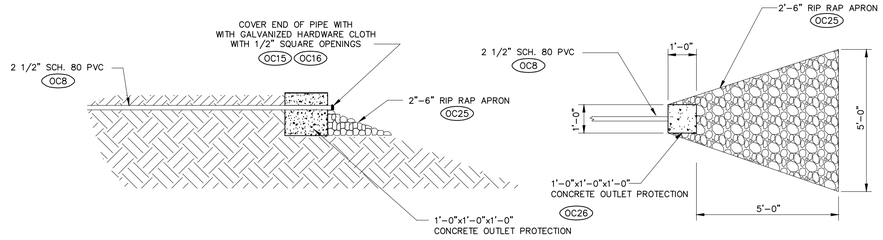
DRAWN BY:	DJD
CHECKED BY:	RSD
APPROVED BY:	RSD
DATE:	10/11/2023
SCALE:	1/2"=1'-0"
FILE NUMBER:	125130C

SHEET: OC2



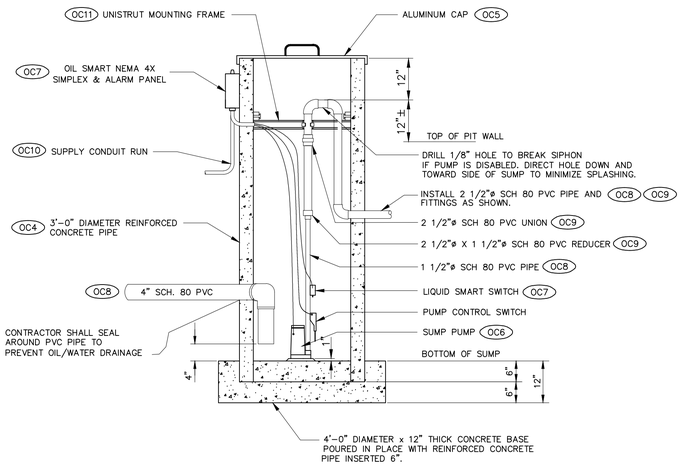
DETAIL No. 1
BASIN OUTLET
N.T.S.



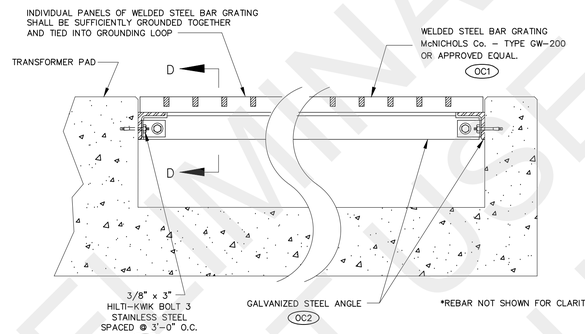


DETAIL No. 2
DRAIN OUTLET
N.T.S.

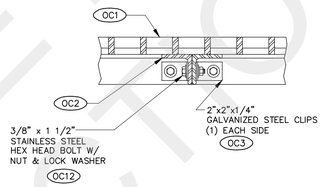
DETAIL No. 1
BASIN OUTLET-ALTERNATE DESIGN
N.T.S.

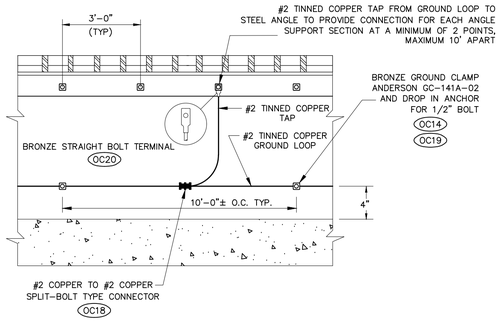


DETAIL No. 3
SUMP PUMP/OIL SENSING DEVICE
N.T.S.

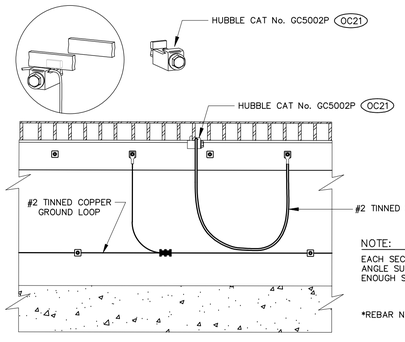


DETAIL No. 4
STEEL BAR GRATING ATTACHMENT TO WALLS & PIERS
N.T.S.

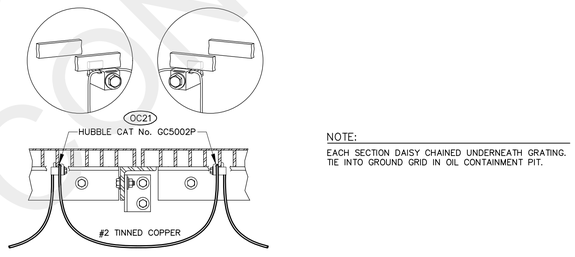




DETAIL No. 5
STEEL ANGLE GROUNDING ATTACHMENT DETAIL
N.T.S.



OPTION 1
N.T.S.



OPTION 2
N.T.S.

DETAIL No. 6
STEEL BAR GRATING GROUNDING ATTACHMENT DETAIL
N.T.S.

PWC Fayetteville's HOME/TOWN UTILITY
Booth & Associates
2300 Rexwoods Drive, Suite 300, Raleigh NC 27607
NC F-1321

NO.	REVISIONS	ENG.	DATE
A	ISSUED FOR BID	RSD	10/11/2023

PROJECT NAME: PO HOFFER 69 TO 15 X 25 kV SUBSTATION

DRAWING TITLE: OIL CONTAINMENT DETAILS

DRAWN BY:	DJD
CHECKED BY:	RSD
APPROVED BY:	RSD
DATE:	10/11/2023
SCALE:	1/2"=1'-0"
FILE NUMBER:	125130C

SHEET: OC3

2

Conduit / Cable Schedules

PO Hoffer 69kV to 15kV Substation

Conduit & Cable Schedules

12502C3.xlsx

for the
Public Works Commission of Fayetteville, NC

06/06/2022

Booth & Associates

2300 Rexwoods Drive, Raleigh, NC 27607
NC F-0221

Rev.	Description	Date	By	Appr.

DRAWING: 12502C3
LEGEND AND NOTES

CONDUIT INSTALLATION:

NOTE:

1	ALL METALLIC JUNCTION BOXES, RACEWAYS, CABLE TRAYS, PANELS, AND ENCLOSURES SHALL BE BONDED TO THE SUBSTATION GROUND GRID.
2	ALL CONDUIT IS 2" SCHEDULE 40 PVC UNLESS OTHERWISE NOTED ON DRAWING.
3	FUTURE EQUIPMENT. CONDUIT TO BE INSTALLED BUT CAPPED AT LOCATION OF FUTURE EQUIPMENT.
4	FUTURE CONDUIT. SHOWN FADED ON CONDUIT PLAN.
	FOR CONDUIT BEARING FIBER OPTIC CABLES (FOC): 1) HAVE NO LESS THAN 8.0 INCH BEND RADIUS. 2) USE OF "LB" FITTINGS SHALL NOT BE PERMITTED. 3) SLOW BENDS AND COMBINATIONS OF 45 DEGREE BENDS OF MINIMUM 8.0 INCH RADIUS ARE PREFERRED. 4) ENSURE BENDS OTHER THAN 90 DEGREES ALSO ENFORCE MINIMUM BEND RADIUS.

CABLE INSTALLATION:

NOTE:

	ALL AC SERVICE NEUTRALS SHALL BE BONDED TO GROUND AT THE SERVICE PANEL AND AT THE POINT OF TERMINATION.
13	**THESE COPPER OR FIBER JUMPERS SUPPLIED WITH SWITCHBOARDS FROM THE SWITCHBOARD VENDOR.** USE AVAILABLE HORIZONTAL AND VERTICAL CABLE MANAGERS TO ROUTE FIBER AND COPPER JUMPERS. USE VELCRO TO SECURE JUMPERS TO ONE ANOTHER AND ELSEWHERE AS NEEDED. WIRE TIES NOT ALLOWED.
14	ALL **AC BRANCH FEEDERS** SHALL OBSERVE THE FOLLOWING COLOR CODE ACCORDING TO ICEA METHOD E1 CABLE: **X - BLACK Y - RED N - WHITE G - GREEN**
15	ALL **DC BRANCH FEEDERS** SHALL OBSERVE THE FOLLOWING COLOR CODE: **POSITIVE (+) - RED NEGATIVE (-) - BLACK**
16	SECONDARYS FOR CURRENT TRANSFORMERS AND VOLTAGE TRANSFORMERS SHALL HAVE CONDUCTORS COLOR CODED ACCORDING TO ICEA METHOD E1 (i.e. RD, GN, BK, WH) UNLESS OTHERWISE NOTED. **A - RED B - GREEN C - BLACK N - WHITE**
17	TERMINATE GENERAL CONTROL CABLE CONDUCTOR COLORS AT RELAY PANEL TERMINAL BLOCKS IN ORDER OF CONDUCTOR NUMBER (ICEA METHOD E2): **BK, RD, BL, OR, YL, BR, RD/BK, BL/BK, OR/BK, YL/BK, BR/BK, BK/RD**. TERMINATE EQUIPMENT END AS NECESSARY TO MATCH FUNCTION.
18	COIL 30 FEET OF CABLE INSIDE SWBD #4 FOR FUTURE USE. TAPE OFF INDIVIDUAL WIRES IN EACH PAIR. TAPE OFF FOIL AND DRAIN WIRE AT BOTH ENDS.
19	**CONTROL HOUSE MANUFACTURER TO INSTALL AND TERMINATE THESE CABLES AND JUMPERS. APPLY LABELS TO ENDS OF CABLES AND JUMPERS PER CABLE AND CONDUIT SCHEDULE (12502C3, THIS DOCUMENT).**

DRAWING: 12502C3
LEGEND AND NOTES

FIBER OPTIC CABLE / CONDUIT INSTALLATION:

NOTE:	
20	1) OUTSIDE PLANT (OSP) FIBER OPTIC CABLES (FOC) SHALL HAVE **NO LESS THAN 8 (EIGHT) INCH BEND RADIUS** DURING INSTALLATION AND **NO LESS THAN 4 (FOUR) INCH BEND RADIUS IN PLACE AFTER INSTALLATION**. 2) **PULLING TENSION NOT TO EXCEED MAXIMUM** PER MANUFACTURER'S SPECIFICATION. 3) NEED 10 FEET OF CABLE IN EQUIPMENT
21	1) FIBER OPTIC CABLE (FOC) **DUPLEX JUMPERS SHALL HAVE NO LESS THAN 1.5 INCH BEND RADIUS**. 2) **PULLING TENSION NOT TO EXCEED MAXIMUM** PER MANUFACTURER'S SPECIFICATION. 3) USE PANDUIT GUIDES IN SWBD #4 TO PROTECT SLACK. 4) "SM" JUMPERS ARE YELLOW IN COLOR. 5) MAKE AND PLACE CABLE NUMBER LABELS AND "DESTINATION" LABELS ON DUPLEX JUMPERS BEFORE INSTALLATION, SEE PRINTS. 6) USE VELCRO STRAPS (BELDEN PN AX100783 OR EQUIVALENT) TO DRESS DUPLEX JUMPERS IN LOOPS TO TAKE UP SLACK IF NEEDED, RESPECTING BEND RADIUS. WIRE TIES ARE NOT PERMITTED AT ANY TIME.
22	**MEASURING AND INSTALLING PRE-TERMINATED FIBER CABLE**: WIREMAN MUST OBTAIN FIBER CABLE PULLING SPECIFICATIONS WELL AHEAD OF INSTALLATION STEPS. WIREMAN MUST KNOW MINIMUM BEND RADIUS FOR THE CABLE BOTH DURING PULL AND WHEN CABLE IN PLACE, MBR DURING PULL IS LARGER THAN THAT WHEN CABLE IS RESTING IN PLACE. WIREMAN MUST KNOW MAXIMUM PULL TENSION FOR THE CABLE BOTH DURING PULL AND WHEN CABLE IN PLACE, MAXIMUM PULL TENSION DURING PULL IS LARGER THAN THAT WHEN CABLE IS IN PLACE. WIREMAN MUST BE FAMILIAR WITH RADIUS GUIDES, ROLLERS, PULLEYS AND TENSION MEASUREMENT EQUIPMENT BEFORE PERFORMING INSTALL.. **1) WIREMAN TO DETERMINE REQUIRED LENGTH OF FIBER OPTIC CABLES** FROM YARD BREAKERS AND TRANSFORMER TO APPROPRIATE PATCH PANEL MOUNTED IN SWITCHBOARD S4 BEFORE PLACING ORDER FROM DISTRIBUTOR. SEE PRINTS FOR FIBER ROUTING IN SWITCHBOARD AND CABLE & CONDUIT SCHEDULE FOR DIRECTION TO DETERMINE ORDER LENGTH. **2) AFTER CONDUIT, TRENCH, WIRE TRAY AND SWITCHBOARDS ARE INSTALLED, MEASURE LENGTH** FOR EACH PRE-TERMINATED FIBER CABLE. MEASURE FROM CONDUIT IN YARD CABINET TO CABLE BRACKET MOUNTED ON EACH PATCH PANEL, SEE CABLE AND CONDUIT SCHEDULE AND SWITCHBOARD PRINTS FOR DETAILS. USE TABLE IN PRINTS TO ADD REQUIRED SLACK.

22 **CONTINUED**	**3)** ORDER CABLE FROM ANIXTER, MORRISILLE, NC. SEE LABOR SPECIFICATION FOR DETAILS TO ORDER. **3A-** PART NUMBER FOR PRE-TERMINATED CABLE IS: **D18-0710-1**. SPECIFY LENGTH OF CABLE, AS DETERMINED FOR EACH CABLE NUMBER, SPECIFY CABLE NUMBER FOR EACH CABLE FROM THIS DRAWING. **4)** M**AKE AND PLACE CABLE NUMBER LABELS AND "DESTINATION" LABELS** ON BOTH ENDS OF CABLE BEFORE INSTALLATION, SEE CABLE AND CONDUIT SCHEDULE FOR "FROM" AND "TO" DESTINATION TEXT . REPLACE LABELS IF DAMAGED DURING PULL. **5) PULL CABLE OFF SHIPPING BOX USING PULL ROPE WITH SWIVEL ATTACHED TO PULLING EYE FITTING** ON END OF CABLE. -RESPECT MINIMUM BEND RADIUS (INSTALL) AND MAXIMUM PULL TENSION (INSTALL). -DO NOT ALLOW CABLE TO BEND LESS THAN MBR WHILE WAITING FOR NEXT PORTION OF PULL OR AT END POINTS DURING AND AFTER PULL. -PULL BY ROPE OR TAPE ATTACHED TO SWIVEL. -ROUTE CABLES WITH CARE. -MULTIPLE CABLES MAY BE PULLED BUNDLED TOGETHER THRU TRAY AND TRENCH SEPARATING THEM AS NEEDED TO PULL IN CONDUIT. -USE RADIUS GUIDES, ROLLERS OVER EDGES, PULLEYS AND ASSISTANTS AS NEEDED TO FACILITATE INSTALL.
22	**7) IF NECESSARY, COIL CABLE ON ITSELF INSIDE SWITCHBOARD**, RESPECTING MINIMUM BEND RADIUS AND SECURE COIL WITH WIRE TIES. ALLOW COILS TO BE DIFFERENT LENGTHS AS NEEDED. CABLE JACKET MAY NOT BE DEFORMED BY WIRE **8) TO CONTAIN CABLE SLACK, CABLE MAY LAY IN OVERHEAD TRAY**, IN AN AREA PAST THE SWITCHBOARDS AND LOOPING BACK TO ENTER SWBD #4. IF CABLE MUST BE COILED IN OVERHEAD TRAY, ENSURE COIL OCCURS FAR DOWN LENGTH OF TRAY IN A CLEAR AREA SO OTHER CABLES ARE NOT OBSCURED BY THE COILS. **9) AFTER INSTALLATION, GROUP CABLES** WHICH ENTER SAME PLACE ON THE PATCH PANEL TOGETHER WITH WIRE TIES. CABLE JACKET MAY NOT BE DEFORMED BY WIRE TIES. **10) MINIMUM BEND RADIUS FOR FIBER CABLE DURING INSTALL IS: 8 (EIGHT) INCHES**. **MAXIMUM PULL TENSION FOR FIBER CABLE DURING INSTALL IS: 100 POUNDS.** **MINIMUM BEND RADIUS FOR FIBER CABLE WHEN IN PLACE IS: 4 (FOUR) INCHES.** **MAXIMUM PULL TENSION FOR FIBER CABLE WHEN IN PLACE IS: 90 POUNDS.** OTHER FIBER OPTIC CABLE ON SITE MAY HAVE DIFFERENT SPECIFICATIONS.
23	CONDUIT BEARING FIBER OPTIC CABLES (FOC): 1) SHALL HAVE NO LESS THAN 8.0 INCH BEND RADIUS. 2) USE OF "LB" FITTINGS SHALL NOT BE PERMITTED. 3) SLOW BENDS AND COMBINATIONS OF 45 DEGREE BENDS OF MINIMUM 8.0 INCH RADIUS ARE PREFERRED. 4) ENSURE BENDS OTHER THAN 90 DEGREES ALSO ENFORCE MINIMUM BEND RADIUS.

DRAWING: 12502C3
LEGEND AND NOTES

24	1) **OUTSIDE PLANT (OSP) FIBER OPTIC CABLE (FOC) FROM BUILDING TO FEEDER BREAKERS AND OTHER YARD DEVICES** TO BE PULLED BY WIREMAN. 2) **FIBER PATCH PANEL AND FIBER SPLICE PANEL (AS NEEDED)** AT THE BREAKER CABINETS AND SCADA SWITCHBOARD TO BE INSTALLED BY CONTRACTOR. 3) **FIBER "JUMPER" CABLES (CABLE NOS. J24 THRU J52 AND J103 THRU J228)** SUPPLIED FROM SWITCHBOARD MANUFACTURER WITH SWITCHBOARD.
25	COAXIAL CABLES (FOR CABLE SEL-C961-025, C961-050) SHALL HAVE NO LESS THAN 6 1/2 INCH BEND RADIUS (13 INCH CIRCLE) DURING INSTALLATION.
ZLC2M	**Corning** 2 fiber Zipcord Jumper, 2.0mm subunit, multimode, **62.5 micron, OM1,** LC duplex to LC duplex connectors. Minimum Bend Radius during install is 2.0 inches, during operation 0.4 inches. Maximum tensile strength during install is 50 lbf. Length 7 feet. No substitutions. PN: **050502K51200tF**
ZLC3M	**Corning** 2 fiber Zipcord Jumper, 2.0mm subunit, multimode, **62.5 micron, OM1,** LC duplex to LC duplex connectors. Minimum Bend Radius during install is 2.0 inches, during operation 0.4 inches. Maximum tensile strength during install is 50 lbf. Length 3 meters. No substitutions. PN: **050502K5120003M**
ZLC3S	**Corning** 2 fiber Zipcord Jumper, 2.0mm subunit, multimode, **9 micron, OS1,** LC duplex to LC duplex connectors. Minimum Bend Radius during install is 2.0 inches, during operation 0.4 inches. Maximum tensile strength during install is 50 lbf. Length 3 meters. No substitutions. PN: **040402G512000003M**
CA605C-xxx	**SEL CAT5E Shielded Patch Cord**, STP, RJ-45 connectors both ends, jacket color Blue. Length is xxx feet as indicated in part number. PN: **CA605CBXxxx. CAT5-04, CAT5-08**
C605A-xxx	**SEL EIA-232**, DB9 connectors both ends. Length is xxx feet as indicated in part number. PN: **C605Axxx. C605A-36, C605A-25**
C961-xxx	**SEL Coaxial cable**, LMR400 cable, TNC connectors both ends. Length is xxx feet as indicated in part number. PN: **C961-xxx. C961-25, C961-50**
C953-xxx	**SEL Coaxial cable**, IRIG, RG58 cable, BNC connectors both ends. Length is xxx feet as indicated in part number. PN: **C953-xxx. C953-6, C953-15, C953-25**

DRAWING: 12502C3
Conduit Schedule

CONDUIT NO.	CONDUIT SCHEDULE		CONDUIT SIZE/TYPE	REMARKS
	FROM	TO		
C101	MANHOLE #1	TRENCH	2" PVC	
C102	MANHOLE #2	TRENCH	2" PVC	
C103	MANHOLE #3	TRENCH	2" PVC	
C111	CIRCUIT EXIT	MANHOLE #1	6" PVC	
C112	CIRCUIT EXIT	MANHOLE #2	6" PVC	
C113	CIRCUIT EXIT	MANHOLE #1	6" PVC	
C114	CIRCUIT EXIT	MANHOLE #2	6" PVC	
C115	CIRCUIT EXIT	MANHOLE #3	6" PVC	
C116	CIRCUIT EXIT	MANHOLE #3	6" PVC	
C180	FIBER HAND BOX	TRENCH	2" PVC	
C181	FIBER HAND BOX	TRENCH	2" PVC	
C201	69KV LINE BKR 52-T1	TRENCH	2" PVC	
C202	69KV LINE BKR 52-T1	TRENCH	2" PVC	
C203	69KV LINE BKR 52-T1	TRENCH	2" PVC	
C204	69KV LINE BKR 52-T1	TRENCH	2" PVC	
C205	69KV LINE BKR 52-T1	TRENCH	2" PVC	
C211	No.1 TRANSFORMER	TRENCH	2" PVC	
C212	No.1 TRANSFORMER	TRENCH	2" PVC	
C213	No.1 TRANSFORMER	TRENCH	2" PVC	
C214	No.1 TRANSFORMER	TRENCH	2" PVC	
C215	No.1 TRANSFORMER	TRENCH	2" PVC	
C216	No.1 TRANSFORMER	TRENCH	2" PVC	NOTE 23
C217	No.1 TRANSFORMER	TRENCH	2" PVC	
C221	FEEDER BREAKER No. 52-1	TRENCH	2" PVC	
C222	FEEDER BREAKER No. 52-1	TRENCH	2" PVC	
C223	FEEDER BREAKER No. 52-1	TRENCH	2" PVC	NOTE 23
C224	FEEDER BREAKER No. 52-1	TRENCH	2" PVC	
C225	FEEDER BREAKER No. 52-1	TRENCH	2" PVC	
C231	FEEDER BREAKER No. 52-2	TRENCH	2" PVC	
C232	FEEDER BREAKER No. 52-2	TRENCH	2" PVC	
C233	FEEDER BREAKER No. 52-2	TRENCH	2" PVC	NOTE 23
C234	FEEDER BREAKER No. 52-2	TRENCH	2" PVC	
C235	FEEDER BREAKER No. 52-2	TRENCH	2" PVC	
C241	FEEDER BREAKER No. 52-3	TRENCH	2" PVC	
C242	FEEDER BREAKER No. 52-3	TRENCH	2" PVC	
C243	FEEDER BREAKER No. 52-3	TRENCH	2" PVC	NOTE 23
C244	FEEDER BREAKER No. 52-3	TRENCH	2" PVC	
C245	FEEDER BREAKER No. 52-3	TRENCH	2" PVC	

DRAWING: 12502C3
Conduit Schedule

CONDUIT NO.	CONDUIT SCHEDULE		CONDUIT SIZE/TYPE	REMARKS
	FROM	TO		
C251	FEEDER BREAKER No. 52-4	TRENCH	2" PVC	
C252	FEEDER BREAKER No. 52-4	TRENCH	2" PVC	
C253	FEEDER BREAKER No. 52-4	TRENCH	2" PVC	NOTE 23
C254	FEEDER BREAKER No. 52-4	TRENCH	2" PVC	
C255	FEEDER BREAKER No. 52-4	TRENCH	2" PVC	
C261	FEEDER BREAKER No. 52-5	TRENCH	2" PVC	
C262	FEEDER BREAKER No. 52-5	TRENCH	2" PVC	
C263	FEEDER BREAKER No. 52-5	TRENCH	2" PVC	NOTE 23
C264	FEEDER BREAKER No. 52-5	TRENCH	2" PVC	
C265	FEEDER BREAKER No. 52-5	TRENCH	2" PVC	
C271	FEEDER BREAKER No. 52-6	TRENCH	2" PVC	
C272	FEEDER BREAKER No. 52-6	TRENCH	2" PVC	
C273	FEEDER BREAKER No. 52-6	TRENCH	2" PVC	NOTE 23
C274	FEEDER BREAKER No. 52-6	TRENCH	2" PVC	
C275	FEEDER BREAKER No. 52-6	TRENCH	2" PVC	
C290	15kV BUS NO. 1 VT JUNCTION BOX	VOLTAGE TRANSFORMERS	1" PVC	ABOVE GROUND
C291	15kV BUS NO. 1 VT JUNCTION BOX	TRENCH	2" PVC	
C292	15kV BUS NO. 1 VT JUNCTION BOX	TRENCH	2" PVC	
C293	15kV BUS NO. 1 VT JUNCTION BOX	TRENCH	2" PVC	
C294	15kV BUS NO. 1 VT JUNCTION BOX	TRENCH	2" PVC	
C300	STATION SERVICE TRANSF. No.1	STA. SERVICE METER BODY	2" PVC	ABOVE GROUND
C301	STA. SERVICE METER BODY	STA. SERVICE NO.1 DISCONNECT	2" PVC	ABOVE GROUND
C302	STA. SERVICE No.1 DISCONNECT	TRENCH	2" PVC	
C303				
C304	STATION SERIVCE FEED FROM STREET	TRENCH	2" PVC	
C341	YARD RECEPTACLE No. 1	TRENCH	1" PVC	
C342	YARD RECEPTACLE No. 2	TRENCH	1" PVC	
C343	YARD RECEPTACLE No. 3	TRENCH	1" PVC	
C344	YARD RECEPTACLE No. 4	TRENCH	1" PVC	
C345	SUMP PUMP NO. 1	TRENCH	2" PVC	
C346	SUMP PUMP NO. 1 CONTROL	TRENCH	1" PVC	
C347	SWITCH BOX #15,16	TRENCH	2" PVC	
C347A	SWITCH BOX #15,16	LIGHT #15,16	1" PVC	ABOVE GROUND
C348	SWITCH BOX #1,2	TRENCH	2" PVC	
C350	SWITCH BOX #1,2	LIGHT #1,2	1" PVC	ABOVE GROUND
C351	LIGHT JUNCTION #3,4	TRENCH	2" PVC	
C353	LIGHT JUNCTION #3,4	LIGHT #3,4	1" PVC	ABOVE GROUND
C354	LIGHT JUNCTION #5,6	TRENCH	2" PVC	
C355	LIGHT JUNCTION #5,6	LIGHT #5,6	1" PVC	ABOVE GROUND

DRAWING: 12502C3
Conduit Schedule

CONDUIT NO.	CONDUIT SCHEDULE		CONDUIT SIZE/TYPE	REMARKS
	FROM	TO		
C357	SWITCH BOX #7	TRENCH	2" PVC	
C358	SWITCH BOX #7	LIGHT #7	1" PVC	ABOVE GROUND
C359	SWITCH BOX #8,9	TRENCH	2" PVC	
C360	SWITCH BOX #8,9	LIGHT #8,9	1" PVC	ABOVE GROUND
C363	SWITCH BOX #10,11	TRENCH	2" PVC	
C364	SWITCH BOX #10,11	LIGHT #10,11	1" PVC	ABOVE GROUND
C366	SWITCH BOX #12,13	TRENCH	2" PVC	
C367	SWITCH BOX #12,13	LIGHT #12,13	1" PVC	ABOVE GROUND
C368	SWITCH BOX #14	TRENCH	2" PVC	
C369	SWITCH BOX #14	LIGHT #14	1" PVC	ABOVE GROUND
C370	240VAC 30A, RECEPTACLE No. 5	TRENCH	2" PVC	
C371	240VAC 50A, RECEPTACLE No. 6	TRENCH	2" PVC	
C375	MOBILE SUBSTATION JUNCTION BOX	TRENCH	2" PVC	
C376	MOBILE SUBSTATION JUNCTION BOX	TRENCH	2" PVC	
C384	FLOOD LIGHT SWITCH BOX #1	TRENCH	2" PVC	
C385	FLOOD LIGHT SWITCH BOX #1	FLOOD LIGHT #1,#2	1" PVC	ABOVE GROUND
C386	FLOOD LIGHT SWITCH BOX #3	TRENCH	2" PVC	
C387	FLOOD LIGHT SWITCH BOX #3	FLOOD LIGHT #3	1" PVC	ABOVE GROUND
C401	SECURITY CAMERA SYSTEM POLE	TRENCH	2" PVC	
C402	SECURITY CAMERA SYSTEM POLE	SECURITY CAMERA SYSTEM POLE	2" PVC	EXISTING
C403	SECURITY CAMERA SYSTEM POLE	TRENCH	2" PVC	
C404	SECURITY CAMERA SYSTEM POLE	SECURITY CAMERA SYSTEM POLE	2" PVC	EXISTING
C405	SECURITY CARD READER	TRENCH	2" PVC	

DRAWING: 12502C3
Cable Schedule

CABLE NO.	CONDUIT NO.	FUNCTION	CABLE SCHEDULE		CABLE WIRE NO. & SIZE	REMARKS
			FROM	TO		
221	**C101**	SUMP PUMP #1 AC POWER	SUMP PUMP #1 AC IN (MANHOLE #1)	AC PANEL No. 2	4/C, #10	
222	**C102**	SUMP PUMP #2 AC POWER	SUMP PUMP #2 AC IN (MANHOLE #2)	AC PANEL No. 2	4/C, #10	
223	**C103**	SUMP PUMP #3 AC POWER	SUMP PUMP #3 AC IN (MANHOLE #3)	AC PANEL No. 2	4/C, #10	
232	**C300**	240VAC STA. SERVICE NO. 1	STA. SERVICE TRANSFORMER No. 1	METER BASE No. 1	3-1/C,#4/0	
232A	**C301**	240VAC STA. SERVICE NO. 1	METER BASE No. 1	STA. SERVICE No.1 DISCONNECT	3-1/C,#4/0	
233	**C302**	240VAC STA. SERVICE NO. 1	STA. SERVICE No.1 DISCONNECT	AUTO TRANSFER SWITCH	3-1/C,#4/0	
234A	**C105**	240VAC SUPPLY	OFFSITE STA. SERVICE DISCONNECT	AUTO TRANSFER SWITCH	3-1/C,#4/0	
235	N/A	240VAC SUPPLY DUCT	AUTO TRANSFER SWITCH	240VAC SPLICE IN DUCT	3-1/C,#4/0	NOTE 19
235	N/A	240VAC SUPPLY DUCT	AC PANEL No.1, MAIN	240VAC SPLICE IN DUCT	3-1/C,#4/0	NOTE 19
235	N/A	240VAC SUPPLY DUCT	AC PANEL No.2, MAIN	240VAC SPLICE IN DUCT	3-1/C,#4/0	NOTE 19
241	N/A	120VAC- BUILDING LIGHTS	AC PANEL No. 2	BUILDING LIGHTS	3-1/C, #12	NOTE 19
242	N/A	120VAC- BLDG EMERGENCY LIGHT	AC PANEL No. 2	BUILDING EMERGENCY LIGHTS	3-1/C, #12	NOTE 19
243	N/A	120VAC- BATTERY ROOM LIGHTS	AC PANEL No. 2	BATTERY ROOM LIGHTS	3-1/C, #12	NOTE 19
244	N/A	120VAC- BUILDING RECEPTACLES	AC PANEL No. 2	BUILDING RECEPTACLES No.2	3-1/C, #12	NOTE 19
245	N/A	120VAC- BUILDING RECEPTACLES	AC PANEL No. 2	BUILDING RECEPTACLES No.1	3-1/C, #12	NOTE 19
246	N/A	240VAC- BATTERY ROOM HEATER	AC PANEL No. 1	BATTERY ROOM HVAC	3-1/C, #12	NOTE 19
247	N/A	120VAC- BATTERY ROOM FAN	AC PANEL No. 2	BATTERY ROOM FAN	3-1/C, #12	NOTE 19
248	N/A	240VAC- BUILDING HVAC	AC PANEL No. 1	BUILDING HVAC	3-1/C, #8	NOTE 19
249	N/A	120VAC- SWITCHBOARD No. S1	AC PANEL No. 1	SWBD #1	4/C, #10	NOTE 19
250	N/A	120VAC- SWITCHBOARD No. S2	AC PANEL No. 1	SWBD #2	4/C, #10	NOTE 19
251	N/A	120VAC- BLDG FLOOD LIGHTS	AC PANEL No. 2	BUILDING FLOOD LIGHTS	4/C, #10	NOTE 19
252	N/A	120VAC- BLDG EMERGENCY LIGHT	AC PANEL No. 2	BATTERY ROOM EMERGENCY LTS	3-1/C, #12	NOTE 19
265	**C345**	120VAC- SUMP PUMP AC POWER	AC PANEL No. 1	SUMP PUMP No. 1 AC IN	4/C,#10	NOTE 14
266	**C345**	120VAC- SUMP CONTROLLER AC	AC PANEL No. 1	SUMP PUMP No. 1 CONTROLLER AC IN	4/C,#10	NOTE 14
287	N/A	120VAC- SWITCHBOARD No. S3	AC PANEL No. 1	SWBD #3	4/C, #10	NOTE 14
288	N/A	120VAC- SWITCHBOARD No. S4	AC PANEL No. 1	SWBD #4	4/C, #10	NOTE 19
301	N/A	120VAC- BATTERY CHARGER	AC PANEL No. 1	BATTERY CHARGER No. 1 AC INPUT	4/C, #10	NOTE 19
302	N/A	48VDC SUPPLY	BATTERY CHARGER No. 1 DC OUT	BATTERY BANK No. 1 TERMINALS	2/C, #10	NOTE 19
303	N/A	48VDC SUPPLY	BATTERY BANK No. 1 TERMINALS	DC PANEL No.1	2-1/C, #4/0	NOTE 19
304	N/A	48VDC SUPPLY	DC PANEL No.1	SWBD #1	2/C, #10	NOTE 15
305	N/A	48VDC SUPPLY	DC PANEL No.1	SWBD #2	2/C, #10	NOTE 15
306	N/A	BATTERY CHARGER ALARMS	BATTERY CHARGER	SWBD #4	4/C, #16	NOTE 19, 17
308	N/A	48VDC SUPPLY	DC PANEL No.1	SWBD #3	2/C, #10	NOTE 15
309	N/A	48VDC SUPPLY	DC PANEL No.1	SWBD #4	2/C, #10	NOTE 15
340	TRAY	STATION SERV. TRANSFER ALARM	STA. SERVICE TRANSFER SWITCH	SWBD #4	4/C, #16	NOTE 19
341	TRAY	DOOR ALARMS	DOOR SWITCH JUNCTION BOX	SWBD #4	4/C, #16	NOTE 19
351	**C180**	PWC-F SITE1, UPSTREAM	OUTSIDE FIBER JUNCTION BOX	SWBD #4, PATCH PANEL No. PP1	SM OSP CABLE	NOTE 20,23,24
352	**C180**	PWC-F SITE2, DOWNSTREAM	OUTSIDE FIBER JUNCTION BOX	SWBD #4, PATCH PANEL No. PP1	SM OSP CABLE	NOTE 20,23,24
1100	**C201**	AC POWER SUPPLY	69KV LINE BKR 52-T1	AC PANEL No.1	4/C #10	NOTE 14
1101	**C201**	DC POWER SUPPLY	69KV LINE BKR 52-T1	DC PANEL No.1	2- 1/C #6	NOTE 15
1103	**C202**	CONTROL	69KV LINE BKR 52-T1	TERMINATION CABINET	12/C #10	NOTE 17
1103A	N/A	CONTROL	TERMINATION CABINET	SWBD #1	12/C #10	NOTE 17
1104	**C203**	LINE PRI RELAY CT'S	69KV LINE BKR 52-T1	TERMINATION CABINET	4/C #10	NOTE 16
1104A	N/A	LINE PRI RELAY CT'S	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1105	**C203**	CONTROL/ INDICATION	69KV LINE BKR 52-T1	TERMINATION CABINET	12/C #10	NOTE 17
1105A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #1	12/C #10	NOTE 17

DRAWING: 12502C3
Cable Schedule

CABLE NO.	CONDUIT NO.	FUNCTION	CABLE SCHEDULE		CABLE WIRE NO. & SIZE	REMARKS
			FROM	TO		
1106	**C204**	INDICATION	69KV LINE BKR 52-T1	TERMINATION CABINET	12/C #14	NOTE 17
1106A	N/A	INDICATION	TERMINATION CABINET	SWBD #1	12/C #14	NOTE 17
1107	**C204**	INDICATION	69KV LINE BKR 52-T1	TERMINATION CABINET	12/C #14	NOTE 17
1107A	N/A	INDICATION	TERMINATION CABINET	SWBD #1	12/C #14	NOTE 17
	C205	SPARE	69KV LINE BKR 52-T1	TRENCH		
1120	**C211**	AC POWER SUPPLY	No.1 TRANSFORMER	AC PANEL No.1	3/C, #6	NOTE 14
1121	**C211**	DC POWER SUPPLY	No.1 TRANSFORMER	DC PANEL No.1	4/C #10	NOTE 15
1122	**C212**	L.V. BANK RELAY CT'S	No.1 TRANSFORMER	TERMINATION CABINET	4/C #10	NOTE 16
1122A	N/A	L.V. BANK RELAY CT'S	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1123	**C212**	L.V. METERING CT's	No.1 TRANSFORMER	TERMINATION CABINET	4/C #10	NOTE 16
1123A	N/A	L.V. METERING CT's	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1124	**C213**	H.V. BANK RELAY CT'S	No.1 TRANSFORMER	TERMINATION CABINET	4/C #10	NOTE 16
1124A	N/A	H.V. BANK RELAY CT'S	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1125	**C213**	X0 RELAY CT	No.1 TRANSFORMER	TERMINATION CABINET	2/C #10	NOTE 16
1125A	N/A	X0 RELAY CT	TERMINATION CABINET	SWBD #1	2/C #10	NOTE 16
1126	**C214**	SPARE	No.1 TRANSFORMER	TERMINATION CABINET	12/C #14	NOTE 17
1126A	N/A	SPARE	TERMINATION CABINET	SWBD #1	12/C #14	NOTE 17
1127	**C214**	LTC VOLTAGE REDUCTION	No.1 TRANSFORMER	TERMINATION CABINET	12/C #10	NOTE 17
1127A	N/A	LTC VOLTAGE REDUCTION	TERMINATION CABINET	SWBD #1	12/C #10	NOTE 17
1128	**C215,C293**	LTC CONTROL POTENTIAL	No.1 TRANSFORMER	15KV BUS No. 1 VT JCT BOX	4/C #10	NOTE 16
1129	**C215**	CONTROL/ INDICATION	No.1 TRANSFORMER	TERMINATION CABINET	12/C, #14	NOTE 17
1129A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #1	12/C, #14	NOTE 17
1130	**C216**	SCADA, ETM2, ATC2	No.1 TRANSFORMER	SWBD #4, PP3, A1-A6	FIBER-PT	NOTE 20,22,23
1131	**C216**	TRIP	No.1 TRANSFORMER	TERMINATION CABINET	12/C, #10	NOTE 17
1131A	N/A	TRIP	TERMINATION CABINET	SWBD #1	12/C, #10	NOTE 17
	C217	SPARE	No.1 TRANSFORMER	TRENCH		
1141	**C221**	AC POWER SUPPLY	FEEDER BREAKER No. 52-F1	AC PANEL No.1	4/C #10	NOTE 14
1142	**C221**	DC POWER SUPPLY	FEEDER BREAKER No. 52-F1	DC PANEL No.1	2- 1/C #6	NOTE 15
1143	**C222**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F1	TERMINATION CABINET	12/C #10	NOTE 17
1143A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #2	12/C #10	NOTE 17
1144	**C222,C291**	RELAY/ METERING POTENTIAL	FEEDER BREAKER No. 52-F1	15KV BUS No. 1 VT JCT BOX	4/C #10	NOTE 16
1145	**C223**	SCADA, PM	FEEDER BREAKER No. 52-F1	SWBD #4, PP3, B1-B6	FIBER-PT	NOTE 20,22,23
1146	**C223**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F1	TERMINATION CABINET	12/C #14	NOTE 17
1146A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #2	12/C #14	NOTE 17
1147	**C224**	DIFFERENTIAL CT'S	FEEDER BREAKER No. 52-F1	TERMINATION CABINET	4/C #10	NOTE 16
1147A	N/A	DIFFERENTIAL CT'S	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1148	**C224**	OVERCURRENT CT'S	FEEDER BREAKER No. 52-F1	TERMINATION CABINET	4/C #10	NOTE 16
1148A	N/A	OVERCURRENT CT'S	TERMINATION CABINET	SWBD #2	4/C #10	NOTE 16
	C225	SPARE	FEEDER BREAKER No. 52-F1	TRENCH		
1151	**C231**	AC POWER SUPPLY	FEEDER BREAKER No. 52-F2	AC PANEL No.1	4/C #10	NOTE 14
1152	**C231**	DC POWER SUPPLY	FEEDER BREAKER No. 52-F2	DC PANEL No.1	2- 1/C #6	NOTE 15
1153	**C232**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F2	TERMINATION CABINET	12/C #10	NOTE 17
1153A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #3	12/C #10	NOTE 17
1154	**C232,C291**	RELAY/ METERING POTENTIAL	FEEDER BREAKER No. 52-F2	15KV BUS No. 1 VT JCT BOX	4/C #10	NOTE 16
1155	**C233**	SCADA, PM	FEEDER BREAKER No. 52-F2	SWBD #4, PP3, B7-B12	FIBER-PT	NOTE 20,22,23
1156	**C233**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F2	TERMINATION CABINET	12/C #14	NOTE 17
1156A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #3	12/C #14	NOTE 17
1157	**C234**	DIFFERENTIAL CT'S	FEEDER BREAKER No. 52-F2	TERMINATION CABINET	4/C #10	NOTE 16
1157A	N/A	DIFFERENTIAL CT'S	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1158	**C234**	OVERCURRENT CT'S	FEEDER BREAKER No. 52-F2	TERMINATION CABINET	4/C #10	NOTE 16
1158A	N/A	OVERCURRENT CT'S	TERMINATION CABINET	SWBD #3	4/C #10	NOTE 16
	C235	SPARE	FEEDER BREAKER No. 52-F2	TRENCH		
1161	**C241**	AC POWER SUPPLY	FEEDER BREAKER No. 52-F3	AC PANEL No.1	4/C #10	NOTE 14
1162	**C241**	DC POWER SUPPLY	FEEDER BREAKER No. 52-F3	DC PANEL No.1	2- 1/C #6	NOTE 15
1163	**C242**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F3	TERMINATION CABINET	12/C #10	NOTE 17
1163A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #2	12/C #10	NOTE 17
1164	**C242,C291**	RELAY/ METERING POTENTIAL	FEEDER BREAKER No. 52-F3	15KV BUS No. 1 VT JCT BOX	4/C #10	NOTE 16
1165	**C243**	SCADA, PM	FEEDER BREAKER No. 52-F3	SWBD #4, PP3,C1-C6	FIBER-PT	NOTE 20,22,23
1166	**C243**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F3	TERMINATION CABINET	12/C #14	NOTE 17
1166A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #2	12/C #14	NOTE 17
1167	**C244**	DIFFERENTIAL CT'S	FEEDER BREAKER No. 52-F3	TERMINATION CABINET	4/C #10	NOTE 16
1167A	N/A	DIFFERENTIAL CT'S	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1168	**C244**	OVERCURRENT CT'S	FEEDER BREAKER No. 52-F3	TERMINATION CABINET	4/C #10	NOTE 16
1168A	N/A	OVERCURRENT CT'S	TERMINATION CABINET	SWBD #2	4/C #10	NOTE 16
	C245	SPARE	FEEDER BREAKER No. 52-F3	TRENCH		

DRAWING: 12502C3
Cable Schedule

CABLE NO.	CONDUIT NO.	FUNCTION	CABLE SCHEDULE		CABLE WIRE NO. & SIZE	REMARKS
			FROM	TO		
1171	**C251**	AC POWER SUPPLY	FEEDER BREAKER No. 52-F4	AC PANEL No.1	4/C #10	NOTE 14
1172	**C251**	DC POWER SUPPLY	FEEDER BREAKER No. 52-F4	DC PANEL No.1	2- 1/C #6	NOTE 15
1173	**C252**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F4	TERMINATION CABINET	12/C #10	NOTE 17
1173A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #3	12/C #10	NOTE 17
1174	**C252,C292**	RELAY/ METERING POTENTIAL	FEEDER BREAKER No. 52-F4	15KV BUS No. 1 VT JCT BOX	4/C #10	NOTE 16
1175	**C253**	SCADA, PM	FEEDER BREAKER No. 52-F4	SWBD #4, PP3, C7-C12	FIBER-PT	NOTE 20,22,23
1176	**C253**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F4	TERMINATION CABINET	12/C #14	NOTE 17
1176A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #3	12/C #14	NOTE 17
1177	**C254**	DIFFERENTIAL CT'S	FEEDER BREAKER No. 52-F4	TERMINATION CABINET	4/C #10	NOTE 16
1177A	N/A	DIFFERENTIAL CT'S	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1178	**C254**	OVERCURRENT CT'S	FEEDER BREAKER No. 52-F4	TERMINATION CABINET	4/C #10	NOTE 16
1178A	N/A	OVERCURRENT CT'S	TERMINATION CABINET	SWBD #3	4/C #10	NOTE 16
	C255	SPARE	FEEDER BREAKER No. 52-F4	TRENCH		
1181	**C261**	AC POWER SUPPLY	FEEDER BREAKER No. 52-F5	AC PANEL No.1	4/C #10	NOTE 14
1182	**C261**	DC POWER SUPPLY	FEEDER BREAKER No. 52-F5	DC PANEL No.1	2- 1/C #6	NOTE 15
1183	**C262**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F5	TERMINATION CABINET	12/C #10	NOTE 17
1183A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #2	12/C #10	NOTE 17
1184	**C262,C292**	RELAY/ METERING POTENTIAL	FEEDER BREAKER No. 52-F5	15KV BUS No. 1 VT JCT BOX	4/C #10	NOTE 16
1185	**C263**	SCADA, PM	FEEDER BREAKER No. 52-F5	SWBD #4, PP3, D1-D6	FIBER-PT	NOTE 20,22,23
1186	**C263**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F5	TERMINATION CABINET	12/C #14	NOTE 17
1186A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #2	12/C #14	NOTE 17
1187	**C264**	DIFFERENTIAL CT'S	FEEDER BREAKER No. 52-F5	TERMINATION CABINET	4/C #10	NOTE 16
1187A	N/A	DIFFERENTIAL CT'S	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1188	**C264**	OVERCURRENT CT'S	FEEDER BREAKER No. 52-F5	TERMINATION CABINET	4/C #10	NOTE 16
1188A	N/A	OVERCURRENT CT'S	TERMINATION CABINET	SWBD #2	4/C #10	NOTE 16
	C265	SPARE	FEEDER BREAKER No. 52-F5	TRENCH		
1191	**C271**	AC POWER SUPPLY	FEEDER BREAKER No. 52-F6	AC PANEL No.1	4/C #10	NOTE 14
1192	**C271**	DC POWER SUPPLY	FEEDER BREAKER No. 52-F6	DC PANEL No.1	2- 1/C #6	NOTE 15
1193	**C272**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F6	TERMINATION CABINET	12/C #10	NOTE 17
1193A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #3	12/C #10	NOTE 17
1194	**C272,C292**	RELAY/ METERING POTENTIAL	FEEDER BREAKER No. 52-F6	15KV BUS No. 1 VT JCT BOX	4/C #10	NOTE 16
1195	**C273**	SCADA, PM	FEEDER BREAKER No. 52-F6	SWBD #4, PP3, D7-D12	FIBER-PT	NOTE 20,22,23
1196	**C273**	CONTROL/ INDICATION	FEEDER BREAKER No. 52-F6	TERMINATION CABINET	12/C #14	NOTE 17
1196A	N/A	CONTROL/ INDICATION	TERMINATION CABINET	SWBD #3	12/C #14	NOTE 17
1197	**C274**	DIFFERENTIAL CT'S	FEEDER BREAKER No. 52-F6	TERMINATION CABINET	4/C #10	NOTE 16
1197A	N/A	DIFFERENTIAL CT'S	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1198	**C274**	OVERCURRENT CT'S	FEEDER BREAKER No. 52-F6	TERMINATION CABINET	4/C #10	NOTE 16
1198A	N/A	OVERCURRENT CT'S	TERMINATION CABINET	SWBD #3	4/C #10	NOTE 16
	C275	SPARE	FEEDER BREAKER No. 52-F6	TRENCH		
1210	**C290**	15KV BUS POTENTIAL FROM VT	15KV BUS No. 1 VT JCT BOX	15KV BUS VT- VA, VB, VC, VN	4/C #10	NOTE 16
1211	**C293**	15KV BUS POTENTIAL TO DEVICES	15KV BUS No. 1 VT JCT BOX	TERMINATION CABINET	4/C #10	NOTE 16
1211A	N/A	15KV BUS POTENTIAL TO DEVICES	TERMINATION CABINET	SWBD #1	4/C #10	NOTE 16
1212	**C293**	15KV BUS POTENTIAL TO DEVICES	15KV BUS No. 1 VT JCT BOX	TERMINATION CABINET	4/C #10	NOTE 16
1212A	N/A	15KV BUS POTENTIAL TO DEVICES	TERMINATION CABINET	SWBD #2	4/C #10	NOTE 16
1213	**C293**	15KV BUS POTENTIAL TO DEVICES	15KV BUS No. 1 VT JCT BOX	TERMINATION CABINET	4/C #10	NOTE 16
1213A	N/A	15KV BUS POTENTIAL TO DEVICES	TERMINATION CABINET	SWBD #3	4/C #10	NOTE 16
1221	**C346**	SUMP PUMP NO. 1 ALARMS (OIL CONTAINMENT)	SUMP PUMP No. 1 ALARMS OUT	TERMINATION CABINET	4/C, #16	
1221A	N/A	SUMP PUMP NO. 1 ALARMS (OIL CONTAINMENT)	TERMINATION CABINET	SWBD #4	4/C, #16	
1261	**C341**	120VAC- YARD RECEPTACLE No.1	AC PANEL No. 2	YARD RECEPTACLE No. 1	4/C,#10	NOTE 14
1262	**C342**	120VAC- YARD RECEPTACLE No.2	AC PANEL No. 2	YARD RECEPTACLE No. 2	4/C,#10	NOTE 14
1263	**C343**	120VAC- YARD RECEPTACLE No.3	AC PANEL No. 2	YARD RECEPTACLE No. 3	4/C,#10	NOTE 14
1264	**C344**	120VAC- YARD RECEPTACLE No.4	AC PANEL No. 2	YARD RECEPTACLE No. 4	4/C,#10	NOTE 14
1267A	**C386**	120VAC- FLOOD LIGHTS #3	AC PANEL No. 1	FLOOD LIGHT SWITCH BOX No. 3	4/C,#10	NOTE 14
1267B	**C386**	120VAC- FLOOD LIGHTS #3	FLOOD LIGHT SWITCH BOX No. 3	FLOOD LIGHT No. 3	4/C,#10	NOTE 14
1267C	**C384**	120VAC- FLOOD LIGHTS #1,2	FLOOD LIGHT SWITCH BOX No. 3	FLOOD LIGHT SWITCH BOX No. 1,2	4/C,#10	NOTE 14

DRAWING: 12502C3
Cable Schedule

CABLE NO.	CONDUIT NO.	FUNCTION	CABLE SCHEDULE		CABLE WIRE NO. & SIZE	REMARKS
			FROM	TO		
1267D	**C385**	120VAC- FLOOD LIGHTS #1,2	FLOOD LIGHT SWITCH BOX No. 1,2	FLOOD LIGHT No. 1,2	4/C,#10	NOTE 14
1268	**C348**	120VAC- BAY 1- LIGHTS #1,2	AC PANEL No. 1	SWITCH BOX No. 1,2	4/C,#10	NOTE 14
1269	**C350**	120VAC- BAY 1- LIGHTS #1,2	SWITCH BOX No. 1,2	LIGHT No. 1,2	4/C,#10	NOTE 14
1270	**C348, C351**	120VAC- BAY 1- LIGHTS #3,4	SWITCH BOX No. 1,2	SWITCH BOX No. 3,4	4/C,#10	NOTE 14
1271	**C353**	120VAC- BAY 1- LIGHTS #3,4	SWITCH BOX No. 3,4	LIGHT No. 3,4	4/C,#10	NOTE 14
1272	**C351,C354**	120VAC- BAY 1- LIGHTS #5,6	SWITCH BOX No. 3,4	SWITCH BOX No. 5,6	4/C,#10	NOTE 14
1273	**C355**	120VAC- BAY 1- LIGHTS #5,6	SWITCH BOX No. 5,6	LIGHTS No. 5,6	4/C,#10	NOTE 14
1274	**C354,C357**	120VAC- BAY 2- LIGHT #7	SWITCH BOX No. 5,6	SWITCH BOX No. 7	4/C,#10	NOTE 14
1275	**C358**	120VAC- BAY 2- LIGHT #7	SWITCH BOX No. 7	LIGHT No. 7	4/C,#10	NOTE 14
1276	**C359**	120VAC- BAY 1- LIGHT #8-9	AC PANEL No. 1	SWITCH BOX No. 8,9	4/C,#10	NOTE 14
1277	**C360**	120VAC- BAY 1- LIGHT #8-9	SWITCH BOX No. 8,9	LIGHT No. 8,9	4/C,#10	NOTE 14
1278	**C359,C363**	120VAC- BAY 2- LIGHTS #10,11	SWITCH BOX No. 8,9	SWITCH BOX No. 10,11	4/C,#10	NOTE 14
1279	**C364**	120VAC- BAY 2- LIGHTS #10,11	SWITCH BOX No. 10,11	LIGHT No. 10,11	4/C,#10	NOTE 14
1280	**C363,C366**	120VAC- BAY 3- LIGHTS #12,13	SWITCH BOX No. 10,11	SWITCH BOX No. 12,13	4/C,#10	NOTE 14
1281	**C367**	120VAC- BAY 3- LIGHTS #12,13	SWITCH BOX No. 12,13	LIGHTS No. 12,13	4/C,#10	NOTE 14
1282	**C366,C368**	120VAC -BAY 3- LIGHT #14	SWITCH BOX No. 12,13	SWITCH BOX No. 14	4/C,#10	NOTE 14
1283	**C369**	120VAC- BAY 3- LIGHT #14	SWITCH BOX No. 14	LIGHT No. 14	4/C,#10	NOTE 14
1284	**C347, C347A**	120VAC- HIGH SIDE LIGHTS #15,16	AC PANEL No. 1	LIGHTS No. 15,16	4/C,#10	NOTE 14
1285	**C370**	240VAC SUPPLY	AC PANEL No. 2	240VAC 30A, RECEPTACLE No. 5	4/C, #10	NOTE 14
1286	**C371**	240VAC SUPPLY	AC PANEL No. 2	240VAC 50A, RECEPTACLE No. 6	4/C, #8	NOTE 14
1289	**C376**	MOBILE SUB, SCADA	MOBILE SUBSTATION J-BOX	SWBD #4, PP3, A11-A12	FIBER-PT	NOTE 20,22,23
1290	**C375**	MOBILE SUB, CONTROL & ALARM	MOBILE SUBSTATION J-BOX	TERMINATION CABINET	12/C, #10	NOTE 17
1290A	N/A	MOBILE SUB, CONTROL & ALARM	TERMINATION CABINET	SWBD #1	12/C, #10	NOTE 17
1291	**C375**	DC POWER SUPPLY	MOBILE SUBSTATION J-BOX	DC PANEL No.1	4/C #10	NOTE 15
1310	N/A	CNTL/ IND S1 TO S2	SWBD #1	SWBD #2	12/C #14	NOTE 17
1311	N/A	CNTL/ IND S1 TO S3	SWBD #1	SWBD #3	12/C #14	NOTE 17
1312	N/A	CNTL/ IND S1 TO S4	SWBD #1	SWBD #4	12/C #14	NOTE 17
1313	N/A	CNTL/ IND S2 TO S4	SWBD #2	SWBD #4	12/C #14	NOTE 17
1314	N/A	CNTL/ IND S3 TO S4	SWBD #3	SWBD #4	12/C #14	NOTE 17
J24	N/A	IRIG TO 351S, 2,4,6	SWBD #4-CLK, IRIG T05	SWBD #2- F2-2, TEE	C953-25	NOTE 13
J25	N/A	IRIG TO 351S, 2,4,6	SWBD #2- F2-2, TEE	SWBD #2- F4-2, TEE	C953-6	NOTE 13
J26	N/A	IRIG TO 351S, 2,4,6	SWBD #2- F4-2, TEE	SWBD #2- F6-2, TEE	C953-6	NOTE 13
J27	N/A	IRIG TO 351S, 1,3,5	SWBD #2- F6-2, TEE	SWBD #3- F1-2, TEE	C953-15	NOTE 13
J28	N/A	IRIG TO 351S, 1,3,5	SWBD #3- F1-2, TEE	SWBD #3- F3-2, TEE	C953-6	NOTE 13
J29	N/A	IRIG TO 351S, 1,3,5	SWBD #3- F3-2, TEE	SWBD #3- F5-2	C953-6	NOTE 13
J30	N/A	IRIG TO T1P, T1BU, T1M	SWBD #4-CLK, IRIG T06	SWBD #1- T1-P TEE	C953-25	NOTE 13
J31	N/A	IRIG TO T1P TO T1BU	SWBD #1- T1-P TEE	SWBD #1- T1-BU TEE	C953-6	NOTE 13
J32	N/A	IRIG TO T1BU TO T1M	SWBD #1- T1-BU TEE	SWBD #1- T1-M IRIG IN	C953-6	NOTE 13
J33		CLK ANTENNA IN	SEL ANTENNA	SEL SURGE PROTECTOR	C961-025	NOTE 25
J34	TRAY	CLK ANTENNA IN	SEL SURGE PROTECTOR	SCADA SWBD #4- CLK, ANT	C961-050	NOTE 25
J35	N/A	IRIG TO RTAC	SWBD #4-CLK, IRIG T08	SCADA SWBD #4- RTAC, IRIG-B IN	C953-6	NOTE 13
J36	N/A	IRIG TO ICON1	SWBD #4-CLK, IRIG T07	SCADA SWBD #4- ICON1, IRIG-B	C953-6	NOTE 13
J37	N/A	IRIG TO DPAC	SWBD #4-CLK, IRIG T03	SCADA SWBD #4-DPAC, IRIG-B IN	C953-6	NOTE 13
J38	N/A	IRIG TO GW1	SWBD #4-CLK, IRIG T04	SCADA SWBD #4- GW1, IRIG-B IN	C953-6	NOTE 13
J41	N/A	FIBER JUMPER, PWC-F SITE1, UP	SWBD #4-ICON1, #1-AB	SWBD #4-PP1-A1/A2, SITE1	ZLC3S	NOTE 13
J42	N/A	FIBER JUMPER, PWC-F SITE2, DOWN	SWBD #4-ICON1, #2-AB	SWBD #4-PP1-B1/B2, SITE2	ZLC3S	NOTE 13

DRAWING: 12502C3
Cable Schedule

CABLE NO.	CONDUIT NO.	FUNCTION	CABLE SCHEDULE		CABLE WIRE NO. & SIZE	REMARKS
			FROM	TO		
J43	N/A	SCADA, ETSW1 TO RTAC	SWBD #4-ETSW1, PORT8	SWBD #4-RTAC, ETH1	CA605C-008	NOTE 13
J44	N/A	SITE COMM, ICON1 TO GW1	SWBD #4-ICON1, #4-5	SWBD #4-GW1, ETH1	CA605C-008	NOTE 13
J45	N/A	SCADA, BATTERY CHARGER NO. 1	BATTERY CHARGER No. 1	SWBD #4, RTAC, PCI2-2	C605A-36	NOTE 13
J47	N/A	SCADA, TRANSFER SWITCH- 485	AUTOMATIC TRANSFER SWITCH	SWBD #4, RTAC, PCI2-4	C605A-50	NOTE 13
J48	N/A	SITE COMM, GW1 TO SWITCH	SWBD #4-ETSW3, PORT7	SWBD #4-GW1, ETH2	CA605C-008	NOTE 13
J49	N/A	NTP TIME, SYSTEM (ETHERNET)	SWBD #4-ETSW2, PORT 7	SWBD #4-CLK, ETH1	CA605C-004	NOTE 13
J50	N/A	SWITCH NETWORK (ETHERNET)	SWBD #4-ETSW1, PORT 7	SWBD #4-ETSW3, PORT 7	CA605C-008	NOTE 13
J51	N/A	SCADA, DPAC (ETHERNET)	SWBD #4-ETSW1, PORT 6	SWBD #4-DPAC-ETH1	CA605C-008	NOTE 13
J52	N/A	SWITCH NETWORK (ETHERNET)	SWBD #4-ETSW1, PORT 5	SWBD #4-ETSW2, PORT 5	CA605C-004	NOTE 13
J103	N/A	SCADA, IO_F1_2	SWBD #4, ETSW1, 19	SWBD #4, PP3, B3B4	ZLC2M	NOTE 13,19
J104	N/A	SCADA, IO_F2_2	SWBD #4, ETSW1, 20	SWBD #4, PP3, B9B10	ZLC2M	NOTE 13,19
J105	N/A	SCADA, IO_F3_2	SWBD #4, ETSW1, 21	SWBD #4, PP3, C3C4	ZLC2M	NOTE 13,19
J106	N/A	SCADA, IO_F4_2	SWBD #4, ETSW1, 22	SWBD #4, PP3, C9C10	ZLC2M	NOTE 13,19
J107	N/A	SCADA, IO_F5_2	SWBD #4, ETSW1, 23	SWBD #4, PP3, D3D4	ZLC2M	NOTE 13,19
J108	N/A	SCADA, IO_F6_2	SWBD #4, ETSW1, 24	SWBD #4, PP3, D9D10	ZLC2M	NOTE 13,19
J123	N/A	SCADA, 2411 BREAKER No. 52F1_2	52F1_2 PATCH PANEL (SPH01P)	IO_F1_2-PORT 1A	ZLC3M	NOTE 13,19
J124	N/A	SCADA, 2411 BREAKER No. 52F2_2	52F2_2 PATCH PANEL (SPH01P)	IO_F2_2-PORT 1A	ZLC3M	NOTE 13,19
J125	N/A	SCADA, 2411 BREAKER No. 52F3_2	52F3_2 PATCH PANEL (SPH01P)	IO_F3_2-PORT 1A	ZLC3M	NOTE 13,19
J126	N/A	SCADA, 2411 BREAKER No. 52F4_2	52F4_2 PATCH PANEL (SPH01P)	IO_F4_2-PORT 1A	ZLC3M	NOTE 13,19
J127	N/A	SCADA, 2411 BREAKER No. 52F5_2	52F5_2 PATCH PANEL (SPH01P)	IO_F5_2-PORT 1A	ZLC3M	NOTE 13,19
J128	N/A	SCADA, 2411 BREAKER No. 52F6_2	52F6_2 PATCH PANEL (SPH01P)	IO_F6_2-PORT 1A	ZLC3M	NOTE 13,19
J201	N/A	SCADA, ETM1_2	SWBD #4, ETSW1, 9	SWBD #4, PP3, A1A2	ZLC2M	NOTE 13,19
J202	N/A	SCADA, LTC1_2	SWBD #4, ETSW1, 10	SWBD #4, PP3, A3A4	ZLC2M	NOTE 13,19
J203	N/A	SCADA, PMF1_2	SWBD #4, ETSW1, 11	SWBD #4, PP3, B1B2	ZLC2M	NOTE 13,19
J204	N/A	SCADA, PMF2_2	SWBD #4, ETSW1, 12	SWBD #4, PP3, B7B8	ZLC2M	NOTE 13,19
J205	N/A	SCADA, PMF3_2	SWBD #4, ETSW1, 13	SWBD #4, PP3, C1C2	ZLC2M	NOTE 13,19
J206	N/A	SCADA, PMF4_2	SWBD #4, ETSW1, 14	SWBD #4, PP3, C7C8	ZLC2M	NOTE 13,19
J207	N/A	SCADA, PMF5_2	SWBD #4, ETSW1, 15	SWBD #4, PP3, D1D2	ZLC2M	NOTE 13,19
J208	N/A	SCADA, PMF6_2	SWBD #4, ETSW1, 16	SWBD #4, PP3, D7D8	ZLC2M	NOTE 13,19
J209	N/A	SCADA, MOBILE	SWBD #4, ETSW1, 18	SWBD #4, PP3, A11A12	ZLC2M	NOTE 13,19
J211	N/A	SCADA, T1P	SWBD #4, ETSW2, 6	SWBD #1, T1P, PORT5	CA605C-19	NOTE 13,19
J212	N/A	SCADA, T1BU	SWBD #4, ETSW2, 9	SWBD #1, T1BU, PORT5	CA605C-19	NOTE 13,19
J213	N/A	SCADA, T1PM	SWBD #4, ETSW2, 10	SWBD #1, T1PM, PORT1	CA605C-19	NOTE 13,19
J214	N/A	SCADA, RELAY 52-1_2	SWBD #4, ETSW2, 11	SWBD #2, 351S RELAY PORT5	CA605C-19	NOTE 13,19
J215	N/A	SCADA, RELAY 52-2_2	SWBD #4, ETSW2, 12	SWBD #3, 351S RELAY PORT5	CA605C-19	NOTE 13,19
J216	N/A	SCADA, RELAY 52-3_2	SWBD #4, ETSW2, 13	SWBD #2, 351S RELAY PORT5	CA605C-19	NOTE 13,19
J217	N/A	SCADA, RELAY 52-4_2	SWBD #4, ETSW2, 14	SWBD #3, 351S RELAY PORT5	CA605C-19	NOTE 13,19
J218	N/A	SCADA, RELAY 52-5_2	SWBD #4, ETSW2, 15	SWBD #2, 351S RELAY PORT5	CA605C-19	NOTE 13,19
J219	N/A	SCADA, RELAY 52-6_2	SWBD #4, ETSW2, 16	SWBD #3, 351S RELAY PORT5	CA605C-19	NOTE 13,19
J221	N/A	SCADA, TRANSFORMER T1 ETM	T1 PATCH PANEL (SPH01P)	ETM1_1,SEL-2414, PORT 5A	ZLC3M	NOTE 13,19
J222	N/A	SCADA, TRANSFORMER T1 LTC	T1 PATCH PANEL (SPH01P)	LTC1, PORT 5A	ZLC3M	NOTE 13,19
J223	N/A	SCADA, PM BREAKER No. 52F1_2	52F1_2 PATCH PANEL (SPH01P)	PMF1_2-PORT 5A	ZLC3M	NOTE 13,19
J224	N/A	SCADA, PM BREAKER No. 52F2_2	52F2_2 PATCH PANEL (SPH01P)	PMF2_2-PORT 5A	ZLC3M	NOTE 13,19
J225	N/A	SCADA, PM BREAKER No. 52F3_2	52F3_2 PATCH PANEL (SPH01P)	PMF3_2-PORT 5A	ZLC3M	NOTE 13,19
J226	N/A	SCADA, PM BREAKER No. 52F4_2	52F4_2 PATCH PANEL (SPH01P)	PMF4_2-PORT 5A	ZLC3M	NOTE 13,19
J227	N/A	SCADA, PM BREAKER No. 52F5_2	52F5_2 PATCH PANEL (SPH01P)	PMF5_2-PORT 5A	ZLC3M	NOTE 13,19
J228	N/A	SCADA, PM BREAKER No. 52F6_0	52F6_2 PATCH PANEL (SPH01P)	PMF6_2-PORT 5A	ZLC3M	NOTE 13,17
J229	N/A	SCADA, MOBILE XFRM	PATCH PANEL (SPH01P)	PMF5_2-PORT 5A	ZLC3M	NOTE 13,19

END OF CABLE SCHEDULE END OF CABLE SCHEDULE END OF CABLE SCHEDULE

DRAWING: 12502C3
FIBER PRE-TERM ORDER

DETERMINING PRE-TERMINATED ASSEMBLY LENGTHS FOR ORDER:

1) SEE PRINTS FOR DETAILED CONNECTIONS. VERIFY "**CABLE NUMBER**" AND "**TO DEVICE**".

2) WRITE IN "**B- MEASURED PATH LENGTH**" AS ACTUALLY MEASURED.

3) CALCULATE "**E- ORDER LENGTH**" AS SHOWN.

4) ORDER ALL CABLES TOGETHER, TO ENSURE BULK CABLE AVAILABLE IN NEEDED QUANTITY.

5) SPECIFY LENGTH NEEDED PER ITEM ORDERED.

6) SPECIFY CABLE NUMBER (CABLE NUMBER IN THIS TABLE) FOR LABELS PER ITEM ORDERED.

Bank No. 1… **FIBER-PT**

CABLE NUMBER (SPECIFY IN ORDER)	TO DEVICE	A - LENGTH IN YARD CABINET	B - MEASURED PATH LENGTH (SEE NOTE BELOW)	C - TURN LOOP LENGTH	D - JUST-IN-CASE LENGTH	E - ORDER LENGTH: ADD A+B+C+D	ORDER PART No. with 4 digit Length, Feet, and 4 digit Cable No. (SPECIFY IN ORDER)
1130	TRANSFORMER	10 FEET		2 FEET	10 FEET		
1145	FEEDER No. 1 52F1	10 FEET		2 FEET	10 FEET		
1155	FEEDER No. 2 52F2	10 FEET		2 FEET	10 FEET		
1165	FEEDER No. 3 52F3	10 FEET		2 FEET	10 FEET		
1175	FEEDER No. 4 52F4	10 FEET		2 FEET	10 FEET		
1185	FEEDER No. 5 52F5	10 FEET		2 FEET	10 FEET		
1195	FEEDER No. 6 52F6	10 FEET		2 FEET	10 FEET		
1289	MOBILE TRANSFORMER	5 FEET		2 FEET	10 FEET		

NOTE: **B-MEASURED PATH LENGTH** - MEASURE FROM MOUTH OF CONDUIT INSIDE YARD CABINET THRU CONDUIT, TRENCH, TRAY, DROP INTO SWBD #4 THRU LEFT OR RIGHT CABLE OPENING, TO EDGE OF DESIGNATED PATCH PANEL. TAKE CARE TO ROUND CORNERS USING FIBER MINIMUM BEND RADIUS, NOT WITH SHARP BENDS.

3

Owner-Furnished Material List

OWNER-FURNISHED MATERIAL LIST

CLIENT: Fayetteville PWC
PROJECT: PO Hoffer Substation
PROJECT NO.: 22-10714-8015
CONTRACTOR:
DATE: June 2022

ITEM	DESCRIPTION	DELIVERY LOCATION	SUPPLIER	ESTIMATED DELIVERY DATE	QTY
1	69 kV Circuit Breaker	Warehouse		TBD	1 Ea
2	25 kV Circuit Breaker	Warehouse		TBD	6 Ea
3	Manhole	Warehouse		TBD	3 Ea
4	Structure and Equipment Package	Site		TBD	1 Lot
5	Control House (with Relay Panels)	Site		TBD	1 Ea
6	Transformer	Site		TBD	1 Ea

4

Technical Specifications
Oil Containment

PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA

OIL CONTAINMENT SPECIFICATIONS
FOR
PO HOFFER 69 X 25 X 15 kV SUBSTATION

ISSUED FOR BID

PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA

OIL CONTAINMENT SPECIFICATIONS
FOR
PO HOFFER 69 X 25 X 15 kV SUBSTATION

ISSUED FOR BID

Booth & Associates, LLC
Consulting Engineers
2300 Rexwoods Drive, Ste. 300
Raleigh, North Carolina 27607
Firm License No.: F-0221

TECHNICAL SPECIFICATIONS

1.0 General

The Oil Containment Specifications, Foundation Specifications, and Drawings are complementary, each to the other. The Black and Decker Substation project includes the placement of the Oil Containment System for the 69 to 15 kV transformer which has been designed to contain accidental spills and/or tank rupture within the area surrounding the power transformer. The installation of this system involves the excavation of a large basin around the transformer foundation. The basin will be permanently formed with reinforced concrete walls and floors.

The containment basin is designed with a sloped concrete floor to allow all rainwater to collect at a single outlet. Beyond the collection basin, a sump tank containing an electric pump will be connected to this outlet to remove the accumulation of rainwater. A special sensor circuit in the pump control will disconnect the pump motor power in the event the rainwater is ever contaminated by transformer oil; otherwise, the rainwater is pumped into an open outlet pipe.

The Contractor shall be responsible for furnishing the labor and materials to install the concrete basins, and shall be responsible for the labor to complete the installation of the pumps and all associated electrical/plumbing materials for a complete system. The Contractor shall furnish the mechanical sump package as outlined in the "List of Materials for the Oil Containment System" following these specifications. The Contractor shall furnish all concrete, reinforcing steel, galvanized steel bar grating, and framing materials for the concrete basin.

2.0 Submittals

Copies of all reports shall be submitted to the Owner and Engineer within fifteen (15) days of contract award and prior to the performance of any work on the subject project. The Engineer will provide approval within ten days (10 days) of receipt of submittals. All submittals shall be provided to the Owner and Engineer as a single packet. A Submittal Log can be found in Appendix A of the Foundation Specifications.

2.1 Material Reports

Material reports shall be submitted to the Owner and Engineer certifying approved components as shown in the "List of Materials for the Oil Containment System" or as proposed alternates for the following items:

a) PVC Pipe
b) Joint Sealants
c) Reinforced Concrete Pipe
d) Grating
e) Steel Angle
f) Waterstop

2.2 Equipment Reports

Equipment submittals must include the manufacturer, model, accessory equipment, and performance specifications. Equipment cut sheets shall be submitted to the Owner and

Engineer for the following equipment as specified in the "List of Materials for the Oil Containment System":

a) Sump Pump
b) Oil Sensing Device

Alternates of equipment other than that specified in the "List of Materials for the Oil Containment System" must be submitted to the Owner and Engineer for approval.

2.3 Coordination Drawings

Fabrication drawings showing planned size, shape, location, and arrangement shall be submitted to the Owner and Engineer for the following items:

a) Grating
b) Steel Angle

Drawing shall include plan views of elements layout in the oil containment system, as well as detail drawings of the elements.

3.0 Installation

Installation details of the system have been included in the Drawings. Key elements of the system installation are as follows:

3.1 Excavate for the basin about the 69 to 15 kV transformer foundation over an area of approximately 36 feet x 22 feet to elevations as indicated on the drawings. If unsuitable material is encountered, the contractor shall remove the unsuitable material and backfill with well compacted washed stone or no frost structural fill in six inch (6") lifts, or concrete.

3.2 When applicable, install and compact washed stone or no frost structural fill in maximum six inch (6") uncompacted lifts to 80 percent (80%) relative density per ASTM D4253.

3.3 The stone subgrade of this basin area shall be graded for a natural drainage slope as indicated in the Drawings.

3.4 Install the concrete floors and walls to form a permanent basin in accordance with the details shown on the Oil Containment (OC) Drawings. Due care and attention must be given to the placement of conduits, ground conductors, and outlet pipes as illustrated on the Oil Containment Details, the Foundation Details, and the Conduit Plan Drawings. All concrete shall be reinforced with the number and type of steel reinforcing bars or mesh as required by these Drawings. Concrete shall be formed, placed, and cured all in accordance with the provisions of the "Foundations" section of the Technical Specifications.

3.5 When applicable, all galvanized welded steel bar grating must be bonded together in order to form a uniform, continuously grounded area. Individual sheets of welded steel bar grating and galvanized steel angle support members shall be bonded to the grounding loop inside the basin using the appropriate size connectors as shown on the details. Any other type of connector must be approved by the Owner or Engineer.

3.6 The oil containment basin ground loop shall be bonded to the substation power transformer ground bar locations as indicated on the Drawings.

3.7 Install the oil containment sump using a thirty-six inch (36") reinforced concrete pipe (RCP) and mechanical sump package outside the basin outlet per the Drawings at subgrade elevations as noted. The mechanical sump package includes the pump, oil-sensing device, control box, and all necessary hardware and connections. The material in the mechanical sump package shall be installed in accordance with the manufacturer's recommendations and as shown on the Drawings.

3.8 The Contractor shall restore the appropriate soil cover after placement of the sump.

3.9 Install and connect drain pipe from the basin to the sump and from the pump to the drainage outlet.

3.10 Tamp all drain system excavations after placement of pipes with specified backfill materials. Compaction density shall be suitable for heavy equipment vehicular traffic.

3.11 Connect pump control wiring to designated station service circuit.

4.0 Testing

After installation of the mechanical sump package and prior to the completion of the project, the system shall be checked to ensure it is in proper working order. The Contractor is responsible for notifying the Owner at least twenty-four (24) hours before testing the system, in order for a representative to be present at the time of testing.

PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA

PO HOFFER 69 x 15 x 25 kV SUBSTATION

LIST OF MATERIALS FOR THE OIL CONTAINMENT SYSTEM

ITEM	DESCRIPTION	QUANTITY
OC1	Welded Steel Bar Grating – Galvanized with 2" x 3/16" load bearing bars at 1-3/16" o.c., McNichols Company Type GW-200, Serrated Surface (See Drawing OC2 for Panel Arrangement) Distributed by: McNichols Company 251 Wille Road #C Des Plaines, IL 60018-1861 Phone: (847) 635-5100 Fax: (847)635-1115 www.mcnichols.com	650 Sq. Ft. ±
OC2	Galvanized Steel Angle L 3" x 3" x ¼" with ½" x 1" slots at 36" o.c. maximum	240 Lin. Ft. ±
OC3	2" x 2" x ¼" Galvanized Steel Clips	As Required
OC4	36" Diameter Reinforced Concrete Pipe (RCP) x 8'-0" long	1
OC5	Aluminum Checker-Plate Cap, ¼" thick, to fit 36" diameter reinforced concrete pipe, with side lip and lifting handles	1
OC6	Grundfos Series Unilift AP Stainless Steel Submersible Sump Pump, Part No. AP12.40.04.1, 1/2 hp, 115 Volt ac, 10' Power Cord, No Float Switch Distributed By: Daparak, Inc. 4915 Waters Edge Drive Suite 180 Raleigh, North Carolina 27606 Phone: (919) 851-4411 Fax: (919) 859-4837 www.daparak.com	1

ITEM	DESCRIPTION	QUANTITY
OC7	Oil Smart Simplex Panel with Alarm, Oil Smart Switch 30 amp motor start relay and mounting hardware #OSSIM-30 Distributed by: See Water, Inc. 121 North Dillon Street San Jacinto, California 92583 Phone: (951)-487-8073 or (888)-733-9283 Fax: (951) 487-0557	1
OC8	PVC Pipe	
	1-1/2” Schedule 80	4 Lin. Ft. ±
	2-1/2" Schedule 80	160 Lin. Ft. ±
	4" Schedule 80	8 Lin. Ft. ±
OC9	Schedule 80 PVC Fittings	
	4" 90° Elbow (1/4 Bend, Sanitary Ell, Hub x Hub)	2
	4” Cap	1
	1-1/2” MPT x S	1
	2-1/2” x 1-1/2” Reducer	1
	2-1/2" 90° Elbow	3
	2-1/2" Union	1
	2-1/2" Couplings	As Required
OC10	2" PVC Conduit with fittings	As Required
OC11	Unistrut Mounting Frame (See Detail No. 3, Drawing OC3)	5 Lin. Ft.
OC12	3/8” x 1 ½” Stainless Steel Hex Head Bolt with nut and washer	As Required
OC13	3/8” x 3” Stainless Steel Anchors – HILTI Kwik Bolt III Distributed by: HILTI, Inc. 5400 South 122nd East Avenue Tulsa, Oklahoma 741461 Phone: (800) 879-8000 www.us.hilti.com	As Required
OC14	Drop-in Anchor for ½” Bolt	As Required

ITEM	DESCRIPTION	QUANTITY
OC15	Galvanized Hardware Cloth with ½" square openings	1 Sq. Ft.
OC16	Stainless Steel Pipe Clamps	
	For 4" pipe	1
	For 2½" pipe	1
OC17	#2 Tinned Copper	As Required
OC18	#2 Copper to #2 Copper Split Bolt Type Connector	As Required
OC19	Bronze Ground Clamp for #2 Copper	As Required
OC20	Bronze Straight Bolt Terminal #2 Copper	As Required
OC21	Clamp – Hubble Cat. No. GC5002	As Required
OC22	Henry Synco-Flex FR Waterstop (Or approved equal)	180 Lin. Ft. ±
OC23	Henry Synco-Flex FR Waterstop (Or approved equal)	
OC24	PVC Pipe Adhesive	As Required
OC25	Electrical Joint Compound	As Required
OC26	Rip Rap - 2” to 6”	1 Cu. Yd.
OC27	Concrete, 4,000 psi	1 Cu. Yd.

5

Technical Specifications
Foundation

PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA

FOUNDATION SPECIFICATIONS
FOR PO HOFFER
69 X 25 X 15 kV SUBSTATION

ISSUED FOR BID

PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA

FOUNDATION SPECIFICATIONS
FOR PO HOFFER
69 X 15 X 25 kV SUBSTATION

Booth & Associates, LLC
Consulting Engineers
2300 Rexwoods Drive, Ste. 300
Raleigh, North Carolina 27607
Firm License No.: F-0221

TABLE OF CONTENTS

1.0 General

The Foundation Specifications, Oil Containment Specifications, and Drawings are complementary, each to the other.

The Contractor shall furnish and install the reinforced concrete foundations as shown on the drawings, complete with excavation, off-site disposal of excavated spoils, grading, backfilling, and compaction of all excavations to restore existing grade levels, foundation layout, concrete, rebar, tie wire, and forming materials.

The reinforced concrete foundations, footings, piers and pads shall be installed as indicated on the Drawings, and to undisturbed earth. Dimensions indicated for anchor bolt settings shall be checked against the manufacturer's erection drawings, structural steel and/or equipment to be installed prior to the construction of the formwork.

1.1. Special Conditions

The contractor is responsible to review and become familiar with the soil boring report for **PO Hoffer Substation, 401 Hoffer Drive, Fayetteville, North Carolina.**

1.2. Concrete

This section specifies the minimum materials, workmanship, and performance standards for cast-in-place concrete including reinforcing steel, forms, finishing, curing, and other associated work.

Cast-in-place concrete shall be in accordance with the latest applicable requirements of the ACI, ASTM, and CRSI, except as modified by these Specifications. For the purposes of mix design, cast-in-place concrete is considered to be of Exposure Category F2 as defined by ACI 318.

Requirements for Concrete By Exposure Class				
Exposure Class	**Max *w/cm***	**Minimum Compressive Strength**	**Air Content**	**Cement Type**
F2	0.45	4,500	6 ± 1	I

**Source: ACI 318-11, Table 4.3.1

The Owner shall be informed at least 24 hours in advance of the times and places at which concrete will be placed.

1.3. Materials

1.3.1. Cement

Only one (1) brand of cement shall be used for exposed concrete. Cement reclaimed from cleaning bags or leaking containers shall not be used. Cement shall be used in the sequence of receipt of shipments, unless otherwise directed by the Engineer. Cement will be accepted on the basis of the manufacturer's mill certificate of compliance with the Specification requirements. Portland cement shall conform to the "Standard Specifications for Portland Cement", serial designation C150, Type I of the ASTM.

1.3.2. Cementitious Materials

Fly ash shall conform to the latest edition of ASTM C 618 and be of type Class F.

1.3.3. Fine Aggregate

Fine aggregate shall consist of washed natural siliceous sand, composed of clean, hard and durable grains, and shall be of a quality and gradation approved by the Engineer. Manufactured sand will not be accepted. All fine aggregate shall be free from injurious amounts of alkaline and organic impurities. Fine aggregate shall be graded from coarse to fine and shall conform to ASTM C33.

1.3.4. Coarse Aggregate

Coarse aggregate shall consist of crushed stone or other approved inert material with similar characteristics. It shall be clean, hard, durable, and free from injurious amounts of deleterious matter. Clay and shale particles shall not exceed 1 percent (1%). Course aggregate shall be graded from coarse to fine and shall conform to ASTM C33.

1.3.5. Water

Water shall be clean, fresh, and free from injurious amounts of mineral and organic substances. Iron in water shall not exceed 0.25 ppm.

1.3.6. Admixtures

All admixtures are to be supplied by a single approved manufacturer, such as: Master Builders, WR Grace & Co., or Sika Chemical. Admixtures shall conform to the following standards:

Water Reducing (plasticizer)	ASTM C494, Type A
Water Reducing and Retarding	ASTM C494, Type D
High Range Water Reducer	ASTM C494, Type F
High Range Water Reducer and Retarder	ASTM C494, Type G
Air-Entraining Agent	ASTM C260

1.3.7. **Reinforcing Steel**

a. Reinforcing Bars - All reinforcing steel bars shall be of the deformed type conforming to the requirements of ASTM A615 or A706-Grade 60.

b. Welded Wire Fabric – Welded wire fabric reinforcement used in slabs shall conform to the requirements of ASTM A1064. It shall be continuous, shall have joints lapped at least one full mesh, and shall be supported at proper elevations by standard accessories. Lapping of sheets shall be staggered to avoid continuous lap in either direction.

c. Accessories – Accessories such as chairs, ties, bolsters, spacers, etc., shall be of suitable type, as approved, adequate to prevent displacement during construction.

d. Mechanical Splices – Classified Type 2 in accordance with ACI 318-11 and approved by Engineer. Dayton/Richmond "Dowel Bar Splicer" or "Coupler Splice" system, Bar-Lock "Coupler Systems" or Barsplice Products.

1.3.8. **Forms**

Forms shall be made of rigid, straight, and uniform material that is free of injurious chemicals or organic matter.

Plywood	Product Standard PS1, waterproof, resin-bonded, exterior type Douglas fir; face adjacent to concrete Grade B plywood or better.
Metal	Of sufficient gauge to resist deformation.
Fiberboard	Fed Spec LLL-B-810, Type II; tempered, waterproof, screenback.
Lumber	Straight, uniform width and thickness, and free from knots, offsets, holes, dents, and other surface defects.
Chamfer strips	Clear pine, surface against concrete shall be planed.
Form coating	Nonstaining and nontoxic after 30 days, VOC compliant; Burke "Form Release (WB)," L&M Chemical "E Z Strip," Nox-Crete "Form Coating," or Symons "Thrift Kote E."
Polyethylene film	Fed Spec L-P-378D, Type I; 6 mil.

1.3.9. **Finishing Compounds**

Bonding compound	Epoxy - ASTM C881; Sika Chemical "Sikadur Hi-Mod"; or acceptable equal Latex - ASTM C1059; Dayton Acrylic Bonding Agent J40; or acceptable equal
Membrane Curing compound	ASTM C1315, Type I, Class A, maximum VOC 5.8 lb/gal (700 g/L), minimum 25 percent solids, acrylic, nonyellowing, unit moisture loss 0.40 kg/m^2 maximum in 72 hours; L&M Chemical "Dress & Seal 30," Sonneborn "Kure-N-Seal 30," or Symons "Cure & Seal 30%."

1.4. **Submittals**

Three copies of all reports shall be submitted to the Owner and Engineer within fifteen (15) days of contract award and prior to any concreting operations. The Engineer will provide approval within ten days (10 days) of receipt of submittals. All submittals shall be provided to the Owner and Engineer as a single packet. A Submittal Log is provided in Appendix A.

1.4.1. **Material Reports**

The report should include the source and quality of concrete materials and the concrete proportions proposed for the work. Complete certified reports covering the materials and proportions proposed and tested in accordance with ACI 318 shall be submitted to the Owner and Engineer. Reports shall be prepared by an independent testing laboratory. Owner and Engineer review of these reports will be for general acceptability only; continued compliance with all contract provisions will be required.

Reports on cement shall include the type, brand, manufacturer, composition, and method of handling (sack or bulk).

Reports on admixtures shall include the ASTM C260 or ASTM C494 classification, brand, manufacturer, and active chemical ingredients. All admixtures shall be the products of one manufacturer.

Reports on aggregates shall include the source, type, gradation, deleterious substances, soundness, potential for harmful materials, and potential for alkali reactivity. The results of all tests and field service records to verify potential reactivity are required to verify compliance with ASTM C33, including Appendix XI.

A certification that the reinforcing steel furnished complies with the requirements specified in the section titled “Materials” shall be furnished to the Owner and Engineer. The certification shall be signed by the Contractor and the reinforcing steel fabricator.

1.4.2. **Mix Design Reports**

A tentative concrete mix shall be designed and tested for each size and gradation of aggregates and for each mix class specified. Mix Design Reports shall be provided to the Owner and Engineer for each mix class to be utilized in the project and intended use identified on each mix report. Design quantities and test results of each mix shall be submitted to Owner and Engineer for review. With Engineer's and/or Owner's approval, acceptable mixes may be field adjusted as necessary to meet the requirements of these Specifications.

The report for each tentative concrete mix submitted shall contain the following information:

a. Intended use and placement method.
b. Design Slump.
c. Total gallons of water per cubic yard.
d. Cement content.
e. Cementitious materials content.
f. Ratio of fine to total aggregates.
g. Weight (surface dry) of each aggregate per cubic yard.
h. Quantity of each admixture.
i. Air content.
j. Compressive strength based on 7 day and 28 day compression test.
k. Times of initial set.
l. Documentation of required average compressive strength or mix proportioning data per ACI 318.

Initial set tests shall be made at ambient temperatures of 70º F and 90º F to determine compliance with the initial set time specified hereinafter. The test at 70º F shall be made using concrete containing the specified plasticizing and air-entraining admixtures. The test at 90º F shall be made using concrete containing the specified plasticizing retarder and air-entraining admixtures. The initial set shall be determined in accordance with ASTM C403.

1.4.3. **Mix Class**

Each concrete mix class shall be designed and controlled within the limits specified in the following table:

Mix Class Table Coarse					
Usage	**28 Day Strength (psi)**	**Nominal Maximum Aggregate Size No. 4 Sieve**	**Slump ± 1"**	**Min Cement (lb/cu yd)**	**Max Water/ Cement Ratio**
General Usage	4,500	1"	5”	535	0.45
Drilled Piers (dry, uncased, or permanent casing)	4,500	3/4"	5" (1)	560	0.45
Drilled Piers (temporary casing)	4,500	3/4”	7” (1)	560	0.45
Drilled Piers (slurry displacement)	4,500	3/4”	8” (1)	560	0.45
Underwater	5,000	3/4"	8"	658	0.41
Note: A plasticizer or plasticizing retarder shall be included in all general usage and drilled piers concrete mixes. High range water reducer (Type F or G) shall be included in all underwater mixes. (1) Slump requirement during placement with any admixtures.					

**Source: ACI 318-11, Table 4.3.1; ACI 336.1-01, Table 2.4.3; ACI 350-06, Table 4.1.2.1

Concrete shall not be deposited under water, except with specific permission of the Owner and Engineer.

1.5. **Mix Requirements**

The acceptability of concrete will be judged on compliance with the specified requirements listed in the Mix Class Table and not on the basis of strength alone.

1.5.1. **Total Water Content**

Total water content of concrete shall not exceed the amount calculated using the maximum water to cement ratio in the Mix Class Table.

1.5.2. **Slump**

Slump shall not be greater than that indicated in the Mix Class Table for each mix, unless otherwise authorized by the Owner.

1.5.3. **Total Air Content**

The total volumetric air content of concrete after placement shall be six percent plus or minus one percent (6% ± 1%).

1.5.4. **Admixtures**

The admixture content, batching method, and time of introduction to the mix shall be in accordance with the manufacturer's recommendations for compliance with these Specifications.

A plasticizing or plasticizing retarder admixture shall be included in all concrete, unless otherwise accepted by the Owner.

Plasticizing retarder admixture shall be adjusted as specified under the initial set.

1.5.5. **Strength**

The minimum 28 day acceptable compressive strength for each mix class as determined by ASTM C39 shall not be less than that indicated in the Mix Class Table.

All concrete shall exceed the specified minimum compressive strengths. Each test cylinder will be evaluated separately, and the Owner will be the sole judge of the validity and representative qualities of the tests.

In cases where the strength of the test cylinders for any portion of the work falls below the requirements specified herein, the Owner or Engineer may require the Contractor to secure test specimens of the hardened concrete represented by these cylinders. Specimens shall be secured and tested in accordance with ASTM C42 and shall have a minimum diameter of 3 inches.

Dependent upon the location of the concrete section in question, the Owner or Engineer may approve low frequency ultrasonic testing or other nondestructive techniques as an alternate to cone drilling and testing.

If the additional investigation verifies the existence of defective concrete, one of the following remedial actions shall be implemented as determined by the Owner:

a. The Contractor shall assume the costs to remove and replace all defective concrete.

b. The Contractor shall assume the cost of design and construction changes necessary to incorporate the inferior concrete.

c. The Contractor shall provide satisfactory reimbursement or allowance to the Owner for the acceptance of the lower quality concrete.

1.5.6. **Initial Set**

The initial set as determined by ASTM C403 shall not be attained until at least 2.5 hours after the water and cement are added to the aggregates. The quantity of retarding admixture shall be adjusted as necessary to compensate for variations in temperature and job conditions.

1.6. Storage of Materials

Cement shall be stored in suitable moisture proof enclosures. Reclaimed cement or cement that has become caked or lumpy shall not be used.

Aggregates shall be stored so that segregation and the inclusion of foreign materials are prevented. The bottom 6 inches of aggregate piles that have been in contact with the ground shall not be used.

Reinforcing steel and embedments shall be carefully handled and stored on supports that will keep the steel from contact with the ground.

1.7. Batching and Mixing

Batching and mixing may be performed at the jobsite with suitable equipment, or by an acceptable ready-mix concrete supplier. Personnel performing the batching and mixing shall be qualified and experienced. Mixing and transporting concrete shall be in accordance with ASTM C94 unless otherwise indicated herein.

1.7.1. **Batching**

Aggregates and cement shall be measured by weight. Aggregate weights shall be adjusted for moisture content.

Each admixture shall be dispensed by a mechanical device that will ensure accurate and automatic measurement.

The minimum amount of water required to produce the desired slump shall be batched automatically. Any additional water required to produce and maintain a uniform slump shall be added manually by the mixer operator. Slump shall be kept uniform. Aggregates shall float uniformly throughout the mass and the concrete shall flow sluggishly when vibrated.

1.7.2. **Mixing**

Concrete shall be mixed in a rotating drum as specified in ASTM C94 until all ingredients are uniformly distributed throughout the batch. Mixers shall not be loaded in excess of their rated capacities. Each batch shall be completely discharged before the mixer is recharged.

1.7.3. **Ready-Mix Concrete**

Ready-mixed concrete shall conform to ASTM C94, except as otherwise specified herein.

Truck mixers shall be revolving drum type and shall be equipped with a mixing water tank. Only the prescribed amount of mixing water shall be placed in the tank for any one batch, unless the tank is equipped with a device by which the amount of water added to each batch can be readily verified by the Owner.

A delivery ticket shall be prepared for each load of ready-mixed concrete delivered. The truck operator shall hand a copy of each ticket to the Owner at the time of delivery. Tickets shall indicate the mix identification, the number of yards delivered, the quantities of each material in the batch, the outdoor temperature in the shade, the time at which the cement was added, and the numerical sequence of the delivery.

When a truck mixer or agitator is used for transporting concrete, the concrete shall be delivered to the jobsite and completely discharged within 90 minutes, or before the drum has revolved 300 revolutions, whichever comes first, after the introduction of the mixing water to the cement and aggregates, or the introduction of the cement to the aggregates. Longer time periods must be approved by the Engineer. In hot weather, or under conditions contributing to quick stiffening of the concrete, a time less than that specified above may be required by the Engineer. When a truck mixer is used for the complete mixing of the concrete, the mixing operation shall begin within 30 minutes after the cement has been mixed with the aggregates.

1.8. **Placement Temperature**

The temperature of concrete, when being placed, shall be checked in accordance with ASTM C1064 and be as follows:

a. Not less than 40°F in moderate weather.
b. Not less than 50°F in weather during which the mean daily temperature drops below 40°F.
c. Not greater than 90°F during hot weather.

1.9. **Hot Weather Concreting**

Except as modified herein; hot weather concreting shall comply with ACI 305R. A water-reducing retarder shall be added to the concrete mix when the placement temperature of the concrete exceeds 75°F.

At air temperatures of 90°F or above, special procedures shall be applied to keep the concrete as cool as possible during placement and curing. The temperature of the concrete during placement shall not exceed 90°F.

1.10. **Cold Weather Concreting**

The conditions of cold weather concreting exist when the air temperature has fallen to, or is expected to fall below, 40°F during the protection period as described in Section 1.10.7 of this specification. Cold weather concreting shall comply with ACI 306R.

1.10.1. **Embedments and Surfaces**

All surfaces against which concrete is to be placed, including reinforcement, shall be free from snow, ice, and frost. All metallic items embedded in the concrete, including bars, need to be heated if the air temperature is below 10°F. Metallic embedments with a cross-sectional area great than 4 $in.^2$ should be heated above 32°F.

1.10.2. **Subgrade Condition**

Concrete shall not be placed against frozen base or subgrade. Provisions for heating the subgrade or base shall be the responsibility of the Contractor and should be sufficient to raise and maintain the temperature above 32°F.

Contractor shall limit surface temperatures of supporting materials beneath slabs-on-ground and the concrete to a temperature differential of less than 20°F.

1.10.3. **Placement and Protection Temperature**

The minimum temperature of concrete as placed and to be maintained after placement shall be as specified in Line 1 of the **Cold Weather Concrete Temperatures Table**.

Concrete temperatures for placement shall not be more than 20°F of that given in the **Cold Weather Concrete Temperatures Table**.

Methods for ensuring the placement and protection temperature such as concrete mixture acceleration, insulation, heat systems, enclosures, a combination of these practices, or other methods are the responsibility of the Contractor and shall be in accordance with ACI 306R.

1.10.4. **Mixing Temperature**

The minimum temperature of concrete at time of mixing shall be as specified in Lines 2, 3, and 4 of the Cold Weather Concrete Temperatures Table.

Concrete temperatures for mixing shall not be more than 15°F of that given in the **Cold Weather Concrete Temperatures Table**.

Methods for ensuring the mixing temperature such as heating mixing water, heating aggregates, or other methods, are the responsibility of the Contractor and shall be in accordance with ACI 306R.

Cold Weather Concrete Temperatures Table					
		Section size, minimum dimension			
		< 12 in.	12 to 36 in.	36 to 72 in.	> 72 in.
Line	**Air Temp.**	**Minimum concrete temperature as placed and maintained**			
1	-	55°F	50°F	45°F	40°F
		Minimum concrete temperature as mixed for indicated air temperature*			
2	Above 30°F	60°F	55°F	50°F	45°F
3	0 to 30°F	65°F	60°F	55°F	50°F
4	Below 0°F	70°F	65°F	60°F	55°F
5	-	**Max allowable gradual temperature drop in first 24 hours after end of protection**			
		50°F	40°F	30°F	20°F
*For colder weather, a greater margin in temperature is provided between concrete as mixed and required minimum temperature of fresh concrete in place. Note 1: For Line 1, maximum placement temperature is minimum temperature in the table plus 20°F. Note 2: For Lines 2-4, maximum temperature is minimum temperature in the table plus 15°F					

*Source: ACI 306R-16 Cold Weather Concreting, Table 5.1-Recommended concrete temperatures.

1.10.5. **Temperature Records**

Contractor shall be responsible to provide a temperature measuring device at several points within enclosure and recording the temperature no less than twice per 24 hour period. For drilled piers only one measuring device at the edge is required.

The temperature measuring device shall left in place throughout the protection period.

Contractor shall record the maximum and minimum temperature readings in each 24-hour period and provide to the Engineer of Record.

1.10.6. **Concrete Curing**

Curing of concrete shall be in accordance with section 1.14 of this specification. If water curing is used, terminate use at least 24 hours before any anticipated exposure of the concrete to freezing temperatures.

1.10.7. **Concrete Protection Duration**

Concrete shall be protected, at a minimum, as described in the **Cold Weather Concrete Temperatures Table** from the effects of freezing-and-thawing cycles for durations as provided in the **Cold Weather Protection Period Table**.

The protection period of concrete shall extend until the concrete has reached a minimum compressive strength of 3,500 psi, if repeated cycles of freezing-and-thawing are expected prior to the concrete reaching the specified design strength.

1.11. Field Control Testing

The Contractor shall engage an independent professional testing agency and laboratory to provide all necessary equipment and personnel to perform all concrete testing at the Contractor's expense. The testing agency and laboratory must be approved by the Owner and Engineer, prior to commencing work. Personnel performing tests shall be certified ACI Grade 1 Concrete Field Testing Technician. Copies of the test results shall be sent directly from the testing agency to the Engineer for review. Structures or equipment shall not be placed on the foundations until acceptance of test results by the Engineer.

The frequency hereinafter specified for each field control test is a minimum. If directed to do so by the Owner, any additional field control tests required shall be made.

1.11.1. Sampling

All concrete used for testing purposes shall be obtained in accordance with ASTM C172.

1.11.2. Slump

Consistency will be determined in the field by the slump test in accordance with ASTM C143. A minimum of one (1) slump test shall be performed on each load of concrete. If water is added at the job site to increase the slump, the recorded slump shall be tested after the addition of water. The specified slump for each class and usage of concrete can be found in the Mix Class Table.

1.11.3. Air Entrainment

Air entrained concrete shall be used in all applications where concrete will be exposed to moisture and cycles of freezing and thawing. Air content shall be determined in accordance with ASTM C231 or ASTM C173. A minimum of one (1) air entrainment test shall be performed for each batch of concrete used on the project and from which concrete compression test cylinders are made. The specified air content shall be between five and seven percent (5% and 7%).

1.11.4. Compression Test Cylinders

A set of compression test cylinders is required for each batch of concrete used on the project. Each set will consist of five (5), four inch by eight inch (4" x 8") compressive test cylinders prepared, cured, and delivered in accordance with ASTM C31. Each cylinder shall be labeled with the project name, date, and cylinder identification number. An information card or field report shall be completed for each set of cylinders and shall include the following:

a. Date sampled
b. Time batched
c. Time sampled
d. Ticket number
e. Air temperature
f. Concrete temperature

g. Gallons of water added
h. Specified 28-day strength
i. Slump
j. Air Content
k. Admixtures
l. Concrete mix identification
m. Specific location of pour

The test cylinders shall be transported to a professional testing laboratory at least 8 hours after final set and within 20 to 24 hours from the time they were made. Transportation time of test cylinders shall not exceed 4 hours.

Testing of the cylinders shall be handled by the Contractor through a qualified testing laboratory in accordance with ASTM C39 in accordance with the following schedule:

a. One (1) cylinder at seven (7) days
b. Three (3) cylinders at twenty-eight (28) days
c. One (1) cylinder reserved for a fifty-six (56) day test, if necessary

The Contractor shall require the laboratory to send three sets of compressive test reports to the Owner, in addition to those copies furnished to the Contractor. One (1) copy of the test reports shall be forwarded directly to the Engineer for review within two (2) working days after the tests are performed.

In the event a test fails to meet the specified compressive strength requirements, the Engineer may require the Contractor to obtain core samples of the hardened concrete in question. Core samples shall be secured and tested in accordance with ASTM C42 and shall have a minimum diameter of three inches (3”). If tests further substantiates that the concrete represented by the cylinders and core samples is below the strength requirements specified herein, the Engineer may order such concrete removed and replaced at the expense of the Contractor.

At the location of pole foundations one of the cylinders shall be taken from the concrete used in the top 5 feet of each pole foundation. Such cylinders shall be individually identified by pole number and tested prior to pole erection.

1.11.5. **Test Reports**

Certified reports of all tests made by the testing laboratory shall be promptly furnished to the Owner and Engineer, and all other persons designated by the Owner.

1.12. Compaction

The contractor shall engage an independent professional Geotechnical engineering firm to provide all necessary equipment and personnel to perform excavation inspections of foundation subgrade. If unsuitable material is encountered at the proposed subgrade elevation shown on the drawings, the contractor shall, under the direction of the

geotechnical engineer, remove the unsuitable material and backfill with well compacted six inch (6″) layers of stone or gravel base material, or concrete. Compacted sub grade shall be approved for 3,000 lbs per square foot bearing capacity by the Geotechnical engineer.

1.13. **Protection Against Moisture Loss**

Immediately after placing or finishing, concrete surfaces not covered by forms shall be protected against moisture loss (cured) for not less than seven (7) days by covering with white opaque polyethylene sheets lapped four inches (4”) at edges and ends. Burlap may be used only for unexposed concrete surfaces and shall be in at least two (2) layers. Surface from which forms are removed before the curing period has elapsed shall be protected as specified for surfaces not covered by forms. All materials used for prevention of moisture loss shall be in accordance with ASTM C171.

1.14. **Curing**

Curing of concrete shall be by methods which will keep the concrete surfaces adequately wet during the specified curing period and in accordance with ACI 308R. Troweled surfaces shall be cured, except those which will receive a separate finish or coating, with the membrane curing compound specified in the article titled “Materials” in this section. Float finished surfaces shall be cured, except those which will receive a separate finish, with either the membrane curing compound specified or with water. Only water curing will be permitted on surfaces that will receive a separate finish or coating.

Water saturation of concrete surfaces shall begin as quickly as possible, but no later than 12 hours in dry weather and 24 hours in damp weather after initial set of the concrete. The rate of water application shall be regulated to provide complete surface coverage with a minimum of runoff. The application of water to formed surfaces may be interrupted for surface rubbing only over the areas being rubbed at the time. The concrete surface shall not be allowed to become dry during such interruption.

After rubbing has been completed, rubbed surfaces shall be covered with saturated burlap for the remainder of the curing period.

Membrane curing compound shall be applied within 30 minutes after final finishing of the surface. Membrane curing compound shall be spray applied at a coverage of not more than 300 square feet per gallon. Membrane curing shall not be used on surfaces that will be covered at a later date with grout, mortar, concrete, or other coating.

1.15. **Protection**

The Contractor shall protect all concrete against injury until final acceptance by Owner. The Contractor shall be prepared to protect all concrete in accordance with the requirements of this paragraph. Temperature shall be controlled by controlling the temperature of aggregate and mixing water. Mixing time shall be kept at a minimum and elapsed time between mixing and placing shall be minimized. The interior surfaces of forms and ground upon which concrete is to be placed shall be thoroughly wetted before concrete is poured. After the first frost and until the mean daily temperature in the vicinity of the work rises above 40°F for more than 1 day, the concrete shall be protected

against freezing for not less than 72 hours after it is placed, using insulation material with or without supplementary heat in accordance with ACI 306R.

1.16. Earthwork

1.16.1. Surveying

Prior to commencing earthwork, the Owner shall provide staking at the site. This will include substation centerline, transmission line center line, including points of intersection (PIs) and line of sight points, and new structure pole and anchor locations. Excavation work shall not proceed until Owner approves staked structure locations.

The Contractor shall be responsible for all necessary environmental and roadway surveying necessary to complete the project. The Contractor shall perform all subsequent layout work necessary to ensure that the foundation is constructed to the correct dimensions and in the locations specified on the Drawings. If the Contractor finds that any staking has been disturbed, is missing or is in error, he shall notify the Engineer promptly. The Contractor shall exercise caution to protect all reference staking.

1.16.2. Subsurface Conditions

The Contractor shall familiarize himself with the subsurface conditions as shown on the boring logs, and exercise his own judgment as to the nature and difficulty of the proposed work. It should be noted in particular that the ground water level may change from the level existing at the time of the test borings.

1.16.3. Excavations

All excavation will be classified as “common excavation.” All excavation, including soft shale, gravel or other material, which can be moved by hand or machine, is defined as common excavation. Owner shall be notified if excavated material is significantly different from that indicated in the soil borings. Excavation work shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the contract work, regardless of the type, character, composition, or condition thereof. Over- excavation shall be backfilled with well compacted six inch (6″) layers of stone or gravel base material, or concrete. If the over-excavation is unnecessary, the cost of the backfill shall be borne by the Contractor. The quality of the soil and the adequacy of its bearing value shall be decided by the Engineer before backfill or concrete is placed in any excavation. Where water is encountered, the excavation shall be kept dry by pumping during the installation of the structure and during the backfilling process. If unsuitable material is encountered at the proposed bearing surface under the concrete foundation, the Geotechnical Engineer may require further excavation to reach sound bearing. Proposed washed stone or no frost structural fill indicated under foundations is required as an integral part of the foundations. The dimensions indicated on the drawings are a minimum and required for adequate foundations.

All existing underground pipes, conduits, drains, and other underground facilities uncovered or otherwise affected by the excavation work shall be located, protected, shored, braced, supported, and maintained.

Excavation for structures shall be performed according to lines and elevations indicated on the drawings and to the limits required to perform the line construction work. Machine excavation shall be controlled to prevent undercutting the proper subgrade elevations. Machine excavation shall not be used within 5 feet of existing permanent structures and facilities. Only hand tools shall be used for excavation around existing permanent structures and facilities.

Work shall be performed so that construction areas will be as free as possible from obstructions and from interference with the transportation, storage, or handling of materials. Excavated materials free of trash, rocks, roots, and other foreign materials, and that meet the specified requirements, may be used as required for backfills constructed under these Specifications.

Excavations shall be maintained in a safe, clean, and sound condition up to the time of placement of concrete. All excavations shall be suitably protected when not attended. Whenever necessary, the Contractor shall re-excavate materials which have accumulated in previously prepared excavations. Any muck or other unsatisfactory bearing material resulting from frost, action or entrance of water into excavations previously prepared to the required bearing shall be removed and replaced with well-compacted stone or gravel, backfill or concrete at the Contractor's expense.

Subgrades for structures shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workers.

Subgrades that are otherwise solid but become mucky on top due to construction operations shall be reinforced with one or more layers of crushed rock or gravel subgrades.

The finished elevation of stabilized structure subgrades shall not be above the subgrade elevations indicated on the drawings.

1.16.4. **Backfill (Other than subgrade)**

Material for backfill shall be composed of earth free of wood, grass, roots, broken concrete, large stones, trash, or debris of any kind.

A Standard Proctor Compaction Test shall be performed on the proposed backfill material samples. The samples should be tested to determine the maximum, dry density, optimum moisture content and natural moisture content. These test results are to be used to ensure proper compaction during backfilling procedures.

All fill material shall be placed in lifts not to exceed eight inches (8″) in un-compacted thickness and be free of all organic material. Fill shall not be placed in

heavy rain or placed on frozen ground. Frozen material shall not be used as backfill.

Field compaction tests shall be taken by the approved geotechnical engineer from each fill volume measuring 2,000 feet^2 maximum by twelve inches (12″) deep. If testing results indicate that compaction does not meet specified requirements, fill materials shall be removed, replaced as required, and compacted and retested until acceptable.

All fill areas shall be compacted to at least ninety-five percent (95%) of the Standard Proctor maximum dry density.

1.16.5. **Rock Excavation**

The Contractor shall be responsible for the removal and proper disposal of solid rock when encountered in holes for concrete foundations. Solid rock shall be defined as solid, naturally-occurring mineral formations that cannot be effectively removed by conventional trenchers, backhoes, or pressure augers. Loose rock or limestone in intermittent layers that result in "difficult digging" shall not be defined as solid rock excavations. "Solid rock" shall require the use of air hammers, blasting or other specialized equipment (Note: Blasting must be approved by the Owner or Engineer in accordance with local ordinances). When solid rock, boulders, or detached stones are encountered and cannot be removed by normal power-driven drills or augers, the Owner shall be notified. Rock excavation techniques shall be used to achieve the desired excavated dimensions. Rock excavation shall consist of igneous, metamorphic, and sedimentary stones, each having a volume of 1/2 cubic yard or more, as determined by physical or visual measurements and approved by Owner.

If rock is encountered, it shall be removed and replaced with suitable materials in such a manner as to provide fully compacted earth in all areas disturbed external to foundations. In the event that rock is encountered in the excavation, the Contractor shall be compensated for such rock removal, based upon unit price as set forth by the Contractor in the Form of Proposal. In the event such rock is encountered, it shall be the duty of the Contractor to notify the Engineer and/or Owner and arrange a meeting to agree upon the approximate total cost for the removal of the rock, prior to any removal of the rock. Quantities will be agreed upon jointly by the Contractor and the Owner (or Engineer) as excavations occur. Over-excavation to remove rock will not be counted in the quantity of rock excavations.

An accurate record shall be kept of the dates and amounts of rock excavation at each location. The Owner will authorize payment for rock excavation at each location by signing the Contractor's record as excavations occur. Payment will be on a cubic yard basis as measured in place in the hole requiring rock excavation. This measurement will be based on the foundation excavation or normal trench width and depth, as if no rock were encountered.

In cases where the extent of rock excavation is questioned, the Engineer and/or Owner may require the Contractor to prove that material should be classified as rock excavation. The Contractor shall provide a demonstration that the material

cannot be removed with a backhoe equipped with a minimum one-half (1/2) cubic yard heavy-duty trenching bucket placed on a machine capable of a lifting capacity of 7,500 pounds at a trench depth of ten feet (10'). The Contractor may be required to provide equipment specification data verifying that the above minimum-rated equipment will be used for demonstration purposes. The equipment is to be in good repair and in proper working condition.

1.16.6. **Blasting**

Blasting or other use of explosives will not be permitted without Owner's approval.

1.16.7. **Sheeting and Shoring**

The Contractor shall do all bracing, sheeting, and shoring necessary to perform and protect all excavations as required for safety and to conform to laws and regulations of all governmental bodies having jurisdiction. When sheeting is used, it shall be removed during or upon completion of backfilling.

The stability of previously constructed structures and facilities shall not be impaired or endangered by new excavation work. Previously constructed structures and facilities include those existing when this construction begins and those provided under these Specifications.

Adequate sheeting and shoring shall be provided as required to protect and maintain the stability of previously constructed structures and facilities and the sides of excavations until they are backfilled. Sheeting, bracing, and shoring shall be designed and built to withstand all loads that might be caused by earth movement or pressure. Sheeting and shoring shall maintain the shape of the excavation under all circumstances.

2.0 Slabs on Grade and Mat Foundations

2.1. General

This section covers general installation of concrete slabs on grade, mat foundations, and vertical surfaces; formwork; testing of concrete for slabs on grade and mat foundations; and other appurtenant work. All work shall be in accordance with the Plans, Specifications, and Assembly Drawings.

2.2. Concrete

The Contractor shall supply ready mixed concrete prepared in accordance with ASTM C94, "Standard Specification for Ready-Mixed Concrete" with a minimum compressive strength of 4,500 psi at twenty-eight (28) days when tested in accordance with ASTM C39. Concrete shall conform to specifications in Mix Class Table. Air content for concrete in slabs on grade and mat foundations shall be six percent plus or minus one percent (6% ± 1%).

2.3. Subgrade

The subgrade shall be brought to an even plane and compacted solid. Washed stone or no frost structural fill shall be installed, at a minimum, as indicated on the drawings and properly compacted. All slabs on grade and mat foundations shall be placed on a minimum six inch (6") thick layer of compacted washed stone. An independent professional Geotechnical engineering firm shall inspect all subgrades for adequate bearing capacity as specified on the Foundation Drawings.

2.4. Formwork

Forms shall be constructed to the shape, form, line, and grade required and shall be maintained sufficiently rigid to prevent deformation under the load imposed by supported inserts or by wet concrete. The top edges of forms shall be finished to a specified elevation, slope, or contour. They shall be brought to a true line and grade so that the top concrete surface can be finished with a screed or template resting on the top edges of the forms.

Design and construction tolerances shall be in accordance with ACI 117. Forms shall be designed and constructed in proper position and accurate alignment. Formed surfaces exposed to view shall have a Class C finish, and concealed surfaces may have a Class D finish as defined by ACI 301.

Concrete shall be placed against job-built plywood forms or forms that are lined with plywood or fiberboard, except as otherwise specified. At Owner's discretion, prefabricated forms or metal frames may be permitted only for surfaces that are not normally exposed to view when construction has been completed. Plywood and fiberboard shall be new when brought to the construction site and shall be properly coated, protected, and maintained throughout its use. All plywood and fiberboard materials that are damaged, cracked, weathered, or otherwise unsuitable, in the Owner's opinion, for producing smooth, uniformly textured formed surfaces will be rejected as form material.

Vertical surfaces of footings extended above grade shall be formed.

Form ties shall be of the removable end, permanently embedded body type, and shall have sufficient strength, stiffness, and rigidity to support and maintain the form in proper position and alignment without the use of auxiliary spreaders. Outer ends of the permanently embedded portions of form ties shall be at least 1 inch back from adjacent outer concrete faces. Permanently embedded portions of form ties that are not provided with threaded ends shall be constructed so that the removable ends can be broken off by twisting, without chipping or spalling the concrete surface. The type of form ties used shall be acceptable to the Owner.

Form ties shall be uniformly spaced in exposed surfaces and aligned in horizontal and vertical rows.

After removal of form ties, the resulting voids in the outer concrete face shall be filled with grout and finish flush with surface of concrete.

Chamfer strips shall be placed in forms to bevel all salient edges and corners except edges which are to be buried and edges which are indicated on the drawings as requiring special treatment. Foundations shall have formed beveled salient edges for all vertical and horizontal corners unless specifically indicated otherwise on the drawings. Bevel dimensions shall be 3/4 by 3/4 inch unless indicated otherwise on the drawings.

2.4.1. **Coating**

Forms shall be coated with form oil before reinforcement is placed.

2.4.2. **Removal**

Forms shall not be removed until permission of the Engineer has been obtained.

2.5. Expansion Joints

Expansion joints and joints between slabs and vertical surfaces shall be installed according to the Drawings. Premolded fibrated asphalt expansion joint material shall be in accordance with ASTM 1751 and shall be one-half inch (½") wide and extend from the bottom of the slab to one half inch (½") from the top of the slab. The premolded fibrated asphalt expansion joint material shall then be covered by a one-half inch (1/2") wide strip of polyethylene bond breaker tape. The tape shall be installed along the top of the asphalt expansion joint material only and not on the vertical walls of the slabs. The polyethylene bond breaker tape shall then be covered with one-half inch (½") wide by one-half inch (½") thick by required length of Vulkem #45 polyurethane sealant for horizontal joints and Dymonic FC Polyurethane sealant for vertical joints according to the manufacturer's installation guidelines.

2.6. Construction Joints

Construction joints not indicated on the Drawings shall be so made and located as to least impair the strength of the structure. Where a joint is to be made, the surface of the placed concrete shall be thoroughly wetted and slushed with a coat of neat cement grout

immediately before placing the new concrete. All laitance shall first be removed from the placed concrete.

2.7. Reinforcement

Reinforcements shall be accurately formed. Unless otherwise indicated on the drawings or specified herein, the details of fabrication shall conform to ACI 318.

All bar supports, ties, spacers, bolsters, inserts, screeds, and other concrete accessories required shall be provided to maintain reinforcing in its proper position and permit proper placement of concrete.

Responsibility for the design of all bar support systems shall be assumed by the contractor.

Except where indicated on the drawings, welding of reinforcement for any purpose, and tack welding in particular, is expressly prohibited. Reinforcements upon which unauthorized welding has been performed will be presumed to be damaged and such reinforcing shall be removed and replaced at Contractor's expense. Replacement materials shall conform to all applicable requirements of these specifications.

Welded chairs and supports may be used provided they are clamped or wired to the reinforcement.

Except as otherwise indicated on the drawings, metal reinforcement for concrete shall have the concrete protective cover specified in Chapter 7 of ACI 318.

Steel reinforcing bars shall be placed in the concrete wherever shown on the drawings. Unless otherwise shown on the drawings or directed, measurements made in placing the bars shall be to the center lines of the bars. Before the reinforcing bars are placed, the surfaces of the bars and the surfaces of any metal bar supports shall be cleaned of heavy flaky rust, loose mill scale, dirt, grease, or other foreign substances. After being placed, the reinforcing bars shall be maintained in a clean condition until they are completely embedded in the concrete. Main reinforcement shall have a minimum clear protective cover to the surface of the concrete as shown on the drawings. Reinforcing bars shall be accurately placed and secured in position so that they will not be displaced during the placing of the concrete, and special care shall be exercised to prevent any disturbance of the reinforcing bars in concrete that already has been place. Rustproof metal chairs, metal hangers, metal spacers, or other satisfactory metal supports may be used for supporting reinforcing bars. No metallic reinforcement supports will be allowed to break the plane at the edge of concrete. Precast concrete blocks may be used for supporting reinforcing bars.

With the exception of lapped portions of spliced bars that are wired or clamped together, the clear distance between parallel bars shall be not less than 1.5 times the maximum size of coarse aggregate in the concrete, or less than 2 inches.

Unless otherwise required by the Specifications or drawings, splices shall conform to ACI 318. Splices shall be Class B tension-lapped splices unless a different class is indicated on the drawings.

Splices shall not be used in regions of maximum bending stress. Welded splices shall not be used.

Mechanical splices are acceptable if approved by the Owner.

All reinforcement shall be shop bent cold. No field bends in reinforcement will be permitted.

2.8. Installation of Anchorage Items

Anchorage items, including bolts, dowels, and other similar devices, shall be of sufficient number and size and so located to ensure anchorage sufficient for the purpose intended. Anchorage items shall be checked against equipment base plates and Drawings prior to placing of concrete.

Anchor bolts shall be securely fastened in a template in the dimensions / orientation / spacings to match the structural steel base plate as shown on the Drawings. The template shall be secured to support the anchor bolts independent of the concrete being placed and cast in place during the concrete placement around the anchor bolts to ensure the proper bonding to the concrete.

In the event the anchor bolts are installed and require re-alignment and/or spacing correction, the Contractor shall contact the Owner and Engineer promptly for permission to proceed prior to any realignment methods. Anchor bolt projection shall be installed per the dimensions as shown on the detail drawings.

2.9. Placing

Water shall be removed from excavations before concrete is deposited. Hardened concrete, debris, and other foreign materials shall be removed from the interior of forms and from the inside of mixing and conveying equipment; reinforcement secured in position will be subject to inspection and approval by the Engineer. Runways for buggies or wheelbarrows shall not be supported on reinforcement or formwork.

Concrete shall be conveyed from mixer to forms as rapidly as practicable without segregation or loss of ingredients. Concrete shall be deposited in its final position without moving it laterally in the forms for a distance greater than 5 feet.

Concrete having attained its initial set or having contained its water content for more than one and one half (1 ½) hours shall not be used in the work. Concrete shall not be dropped freely more than five feet (5') in unexposed work nor more than three feet (3') in exposed work. Unless approved by the Engineer, concrete shall be mixed and placed only when the temperature is at least 40°F; concrete footings shall be placed upon surfaces free from frost, ice, mud, loose or unsound rock, and other detrimental substances.

All concrete shall be thoroughly vibrated with appropriate vibrating equipment while concrete is being placed. Settling concrete with shovels only will not be accepted. Vibrators shall not be used as a method to move concrete laterally.

Concrete shall be deposited to the required thickness and finished monolithically to a smooth, level surface by floating and troweling.

2.10. Bonding and Grouting

Before depositing new concrete on or against concrete that has set, the existing surfaces shall be roughened and cleaned. Horizontal construction joints shall be given a brush coat of grout consisting of cement and fine aggregate in the same proportion as the concrete to be placed, following by approximately three inches (3") of concrete of regular mix, except that the proportion of coarse aggregate shall be reduced fifty percent (50%). Grout for setting bearing plates and other items shall be composed of equal parts of sand and Portland Cement.

2.11. Finishes of Concrete Other Than Floors and Slabs

Slight honeycomb and minor defects shall be patched with cement mortar made with one (1) part cement and two (2) parts fine aggregate. Exposed surfaces shall be given a rubbed finish. Fins and other projections shall be carefully removed, offsets leveled, and surface damage repaired. The surfaces then shall be rubbed with cement or carborundum bricks and water, leaving the surface uniformly smooth and clean. Projecting ends of all form ties shall be removed and recessed a minimum of 1 inch. The resulting recesses shall be cleaned, wetted, and filled with patching mortar.

No surface treatment will be required for buried or permanently submerged concrete not forming an integral part of a structure except that required to obtain the surface elevations or contours and surfaces free of laitance. The unformed surfaces of all other concrete shall be screeded and given an initial float finish, followed by additional floating and troweling where required.

Float finished surfaces shall be finished to provide a flat profile per ACI 347 Class C Finishing.

Screeding shall provide a concrete surface conforming to the proper elevation and contour with all aggregates completely embedded in adjacent mortar. Surface irregularities in screeded surfaces shall be limited as required to produce finished surfaces within the tolerances specified. If no further finishing is required, surface irregularities shall not exceed ACI 347 Class C.

Screeded surfaces shall be given an initial float finish as soon as the concrete has stiffened sufficiently for proper working. Any piece of coarse aggregate that may be disturbed by the float or that causes a surface irregularity shall be removed and replaced with mortar. Initial floating shall produce a surface of uniform texture and appearance with no unnecessary working of the surface with the float.

The initial floating shall be followed with a second floating at the time of initial set. The second floating shall produce a smooth, uniform, and workmanlike float finish of uniform texture and color. Unless additional finishing is specifically required, the completed finish for all unformed surfaces shall be a float finish as produced by the second floating.

Floating shall be performed with hand floats or suitable mechanical compactor floats.

Any surfaces designated on the drawings to be troweled shall be steel trowel finished. Troweling shall be performed after the second floating when the surface has hardened sufficiently to prevent an excess of fines being drawn to the surface. Troweling shall produce a dense, smooth, uniform surface free from blemishes and trowel marks.

2.12. **Clean-Up**

All forms shall be completely removed. All materials, equipment, and rubbish shall be removed and the premises left in a neat condition.

3.0 Drilled Cylindrical Foundations

3.1. General

This section covers general requirements for the installation of drilled cylindrical foundations and other appurtenant work. All work shall be in accordance with the Plans, Specifications, Plan & Profile Sheets, and Assembly Drawings. Work shall conform to all requirements of ACI 336.1-01 published by the American Concrete Institute, except as modified by these Contract Documents.

3.2. Concrete

The Contractor shall supply ready mixed concrete prepared in accordance with ASTM C94, "Standard Specification for Ready-Mixed Concrete" with a minimum compressive strength of 4,500 psi for surface mounted structures and 3,000 psi for direct embedded structures at twenty-eight (28) days when tested in accordance with ASTM C39. Concrete shall conform to specifications in Mix Class Table. Air content shall be six percent plus or minus one percent (6% ± 1%).

3.3. Excavations

The diameter and depth of each hole shall be as required for structures to be placed according to the Plans and Drawings. Holes shall be drilled with such types of drilling equipment that will produce the excavation shown on the drawings. Drill rigs, which do not run true, will not be acceptable.

Holes for direct embedded structures shall be as required for compaction of backfill around the pole, but shall not be less than the pole diameter at the butt plus 12 inches.

Holes for caissons shall be as shown on the Plans and Drawings. The depth noted on the drawings is to be considered minimum. If unsuitable materials affecting required bearing value are encountered, the excavation shall be continued to whatever depth is necessary to obtain suitable material per the approval of the geotechnical engineer on site. When depth required by the Owner is greater than depth shown on the drawings, the neat line excavation and volume of reinforced concrete to fill it will be paid for by the Owner.

Hole excavation shall include removal of stumps, roots, and other obstructions necessary to provide a clean vertical hole to the depth specified on the drawings. Excavation shall be performed with a power driven auger. As soon as the auger is withdrawn, any direct embedded structures shall be set to the depth specified on the drawings and in accordance with these specifications.

Excavated holes shall be covered and protected when the associated structures will not be set during the same working day.

Holes may be excavated by the drilling and mud slurry technique. Prior to start of construction, Owner's approval shall be submitted for a drilling mud procedure for wet hole excavation when sufficient side wall pressure cannot be obtained by use of water void of additives. Drilling mud shall be Super Mud manufactured by Polymer Drilling Systems or acceptable equal. Drilling mud shall be mixed in accordance with manufacturer's recommendations and to the proper consistency for maintaining the sides

of the hole. With the Owner's approval, attapulgite clay type drilling mud may be substituted for Super Mud on holes where Super Mud will not provide sufficient side wall pressure to maintain the sides of the hole excavation.

Under no circumstances can bentonitic or kaolinitic clay products be used.

3.4. **Removal of Water**

Adequate dewatering equipment shall be provided and maintained to remove and dispose of all surface and groundwater entering excavations and other parts of the work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until construction to be provided therein is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result. Disposal of water shall be in accordance with federal, state, and local regulations.

If infiltration of groundwater exceeds a rise of one-quarter inch (1/4") per minute or the total height of water in the bottom of the pier exceeds two inches (2"), the pier shall be considered a wet pier and wet pier concrete placement methods shall be used. Wet pier placement methods shall be approved by the Engineer and Owner, prior to the commencement of work.

3.5. **Temporary Casing**

Temporary casing will be required at all excavations where workmen are required to do hand excavation or remove obstructions in the lower portions of the caissons or to re- clean the bottoms of caissons prior to the placement of concrete. Temporary casings will also be required at locations where the soil will not stand without support or where, because of ground water or soil conditions, sloughing of the sides of caissons may seriously delay or endanger the satisfactory completion of excavation and placement of concrete. The Contractor shall have immediately available for use on the job an ample supply of casing for each size that will be required for use in the caissons and shall provide additional amounts, if required, to ensure orderly progress of the job. Such casing may be in short pieces but with jointing pieces of sufficient strength that assembled sections of casing may be pulled complete as concrete is placed or immediately thereafter. The casing shall also be of such strength and rigidity as to maintain the required excavation lines against the pressure of sloughing material from the sides of the caissons. All temporary casing shall be removed from caissons as concrete is placed or immediately thereafter, and in such a manner as to prevent sloughing material from dropping to the bottoms of caissons, falling on top of freshly placed concrete or intruding into the concrete mass.

Permanent casing will not be permitted except by special permission of the Owner or as shown on the drawings.

3.6. **Permanent Casing**

Smooth wall metal pipe casing shall be installed as indicated on the drawings or as permitted by special permission of the Owner.

The casing shall not extend more than 6 inches below the top of the hole. Any part of the casing extending above this elevation shall be cut off. Casings shall be installed as

drilling proceeds or immediately after the auger is withdrawn as required to prevent sloughing or caving of the excavation walls.

3.7. Dimensional Tolerances

The location and dimensions of the drilled caisson shall be as exact as possible to the locations shown on the drawings and staked in the field. The maximum allowable tolerance will be as follows.

Top of the drilled caisson shall be set to the elevation shown on drawings, except where otherwise directed by the Owner or Engineer.

The variation in elevation of the bottom of the drilled caisson from the specified depth shall be from 0 to +6 inches, except where required to be deeper due to soil conditions.

Maximum deviation of the axis of the hole from the vertical shall be no more than 1 inch in 8 feet.

The diameter of any drilled caisson shall not be less than specified or more than 4 inches greater than specified.

3.8. Pier Installation Record

Accurate pier installation records shall be maintained and shall contain the following information for each pier:

a. Contractor's name.
b. Drill rig operator's name.
c. Location/Structure Number.
d. Shaft diameter.
e. Elevation of shaft above grade.
f. Depth of rock.
g. Depth of shaft.
h. Depth of ground water.
i. Caving or sloughing of excavation.
j. Drilling difficulties.
k. Casing insertion, size and length, and whether or not removed.
l. Date and time of start and finish excavation.
m. Length and diameter of reinforcing bar cage.
n. Date and time concrete placed.
o. Calculated volume of excavation based on diameter of shaft.
p. Total quantity of concrete placed.
q. Test Cylinder Numbers in order of placement in foundation (bottom to top)

3.9. Reinforcement

Steel reinforcing bars shall be placed in the concrete wherever shown on the drawings. Unless otherwise shown on the drawings or directed, measurements made in placing the bars shall be to the center lines of the bars. Before the reinforcing bars are placed, the surfaces of the bars and the surfaces of any metal bar supports shall be cleaned of heavy flaky rust, loose mill scale, dirt, grease, or other foreign substances. After being placed, the reinforcing bars shall be maintained in a clean condition until they are completely embedded in the concrete. Main reinforcement shall have a minimum clear protective cover to the surface of the concrete as shown on the drawings. Reinforcing bars shall be accurately placed and secured in position so that they will not be displaced during the placing of the concrete, and special care shall be exercised to prevent any disturbance of the reinforcing bars in concrete that already has been place.

All reinforcement shall be shop bent cold. No field bends in reinforcement will be permitted.

3.10. Concrete Placement General

The handling, depositing, and compacting of concrete shall conform to these Specifications subject to adjustment by the Owner for weather or placement conditions.

Concrete shall not be pumped through aluminum pipe or aluminum alloy pipe.

Before concrete is placed, forms and anchor bolts shall be rigidly secured in their proper position; all dirt, mud, water, and debris removed from the space to be occupied by the concrete; and all surfaces cleaned that may have become encrusted with dried mortar or concrete from previous placement operations. The entire installation shall be acceptable to the Owner.

Anchorage items shall be checked against equipment base plates and Drawings prior to placing of concrete. In the event the anchor bolts are installed and require re-alignment and/or spacing correction, the Contractor shall contact the Owner and Engineer promptly for permission to proceed prior to any realignment methods. Anchor bolt projection shall be installed per the dimensions as shown on the detail drawings.

Cold joints are not allowed unless specifically approved by the Owner and Engineer. When a cold joint is approved the surface of hardened concrete upon which fresh concrete is to be placed shall be rough and clean. An epoxy bonding compound shall be applied in accordance with the manufacturer's recommendation.

Concrete shall be brought to the point of final deposit by methods that prevent the separation or loss of the ingredients. Concrete shall not be allowed to free fall, uncontrolled, more than 5 feet. Concrete shall be deposited in its final position without moving it laterally in the forms for a distance greater than 5 feet.

3.11. Concrete Placement – Dry Hole

Concrete shall be placed in the drilled caisson as soon after excavation as possible. Immediately prior to the placement of concrete, the caisson shall be cleaned of water, debris, or other materials harmful to concrete including ice, clods, and piles of loose

earth. Surfaces against which concrete is being placed shall be free of frost, and in cold weather shall be enclosed or heated, if necessary, prior to placing concrete to ensure this requirement is met. Water in bottom of caissons must be removed or absorbed. Equipment shall include a pump and two vibrators in good working condition, hoppers and elephant trunks for directing the flow of concrete down the caissons, and an ample supply of sacked cement for use in drying the bottom of caissons. The Contractor shall not place any concrete until the excavation and embedded items are checked and approved by the Owner or Engineer. In a drilled caisson where the Contractor can free fall the concrete down the center of the caisson without having the concrete come in contact with the embedded items, which may cause segregation of the aggregate, the Contractor may place the concrete with the use of an elephant trunk or drop chutes and shall use vibrators. The maximum free fall distance shall be no more than 5 feet. If the Owner or Engineer sees the above method cannot be implemented, then the Contractor shall place the concrete for the first lift using hoppers and sections of elephant trunk or drop chutes. Normal procedure expected to be followed by the Contractor will be to place the concrete to an elevation approximately 5 feet above the bottom of the caissons and vibrate this deposit with one pass of the vibrator down to the bottom of the caisson and back to the top of concrete. Following this, the remainder of the concrete may be poured in two or more lifts of equal height with one pass of the vibrator down to the bottom of the lift and back up on each lift. In placing concrete, internally operated vibrators of a minimum diameter of 2-1/4 inches and having a speed of 5,000 rpm or more are to be used. On the upper lifts of the piles, elephant trunks will not be required, but the placing of the concrete shall be done in such a manner as to prevent segregation of the aggregates.

3.12. **Concrete Placement – Wet Hole**

Where sufficient groundwater is encountered during excavation to result in standing water in the caisson, the Contractor shall provide pumps with sumps just large enough for pump sections or special pumps, which can extract water from the bottom of the caisson without the requirement of a sump. Immediately prior to the start of the concrete placement, water shall be pumped from the caisson to the elevation of the bottom of the caisson or, if a sump is used, leaving a depth of water not exceeding 4 inches in the sump. The use of dry cement to “dry up” the water left in the sump will then be permissible provided the rate of inflow is sufficiently slow to permit placement of concrete without increasing the water-cement ratio. To follow this procedure, the Contractor must have dry cement ready to place into the caisson immediately after pumping is terminated and also have adequate concrete at the site. If, in the opinion of the Owner or Engineer, the rate of inflow of ground water is too great to obtain concrete of acceptable quality, it will be necessary for the Contractor to place concrete using the tremie method.

3.13. **Concrete Placement – Tremie Method**

Where the inflow of water into a caisson is too rapid to permit placement of concrete in the dry, the Contractor shall place the concrete underwater by the tremie method. In such cases, a special mix of concrete will be required with coarse aggregate (gravel), ¾ inch maximum size, and a minimum of seven bags of cement per yard. A retarding agent, approved by the Owner and Engineer, may be used. No vibration of the tremie concrete will be required or permitted, but it will be permissible to vibrate the tremie pipe under certain conditions when the flow of concrete becomes sluggish, and it will also be permissible to vibrate the casing, if used, when the caisson is filled with concrete at the

time the casing pull is started. The tremie pipe shall have the minimum diameter of 8 inches and shall be equipped with a foot valve or gate at the bottom end, which is watertight and can be positively controlled from the ground surface. If joints are required in the tremic pipe, they shall be watertight. The entire assembly shall be watertight, and under no circumstances will concrete be permitted to flow through water in the tremie. In placing concrete, the lower end of the tremie shall be placed as close to the bottom as possible and no more than 6 inches to the bottom of the caisson and shall not be raised until a seal has been established between the tremie pipe and the concrete sufficient to prevent entry of water into the tremie. The discharge end of the tremie shall be kept submerged in the concrete a sufficient depth to maintain, at all times, an adequate seal during underwater placement. The placing of concrete by tremie in any caisson shall not be started until a sufficient supply of concrete is at the site to complete placing of concrete in the caisson up to the ground surface. Once started, the underwater placement shall proceed without interruption until the top of the concrete has been brought to the above-mentioned elevation. As soon as the level of concrete has reached the above- mentioned level over the tremie pipe, the Contractor shall remove the water being displaced by the concrete. Concrete may be placed by tremie only when authorized by the Owner or Engineer.

3.14. Consolidation

During and immediately after depositing, concrete shall be consolidated thoroughly and worked around reinforcements, embedments, and into the corners of the forms.

Concrete shall be consolidated by means of mechanical vibrating equipment supplemented by hand rodding, spading, and/or tamping. Unless otherwise accepted by the Owner, mechanical vibrators shall be spud type immersion vibrators which will maintain at least 9,000 cycles per minute when immersed in concrete. The number and type of vibrators shall be subject to the acceptance of the Owner.

The vibrator shall be constantly relocated and placed in each location only once for each lift. Lower lifts shall be vibrated with the one immediately above it.

3.15. Finishes of Concrete Other Than Floors and Slabs

Slight honeycomb and minor defects shall be patched with cement mortar made with one (1) part cement and two (2) parts fine aggregate. Exposed surfaces shall be given a rubbed finish. Fins and other projections shall be carefully removed, offsets leveled, and surface damage repaired. The surfaces then shall be rubbed with cement or carborundum bricks and water, leaving the surface uniformly smooth and clean. Projecting ends of all form ties shall be removed. The resulting recesses shall be cleaned, wetted, and filled with patching mortar.

No surface treatment will be required for buried or permanently submerged concrete not forming an integral part of a structure except that required to obtain the surface elevations or contours and surfaces free of laitance. The unformed surfaces of all other concrete shall be screeded and given an initial float finish, followed by additional floating and troweling where required.

Float finished surfaces shall be finished to provide a flat profile per ACI 347 Class C Finishing.

Screeding shall provide a concrete surface conforming to the proper elevation and contour with all aggregates completely embedded in adjacent mortar. Surface irregularities in screeded surfaces shall be limited as required to produce finished surfaces within the tolerances specified. If no further finishing is required, surface irregularities shall not exceed ACI 347 Class C.

Screeded surfaces shall be given an initial float finish as soon as the concrete has stiffened sufficiently for proper working. Any piece of coarse aggregate that may be disturbed by the float or that causes a surface irregularity shall be removed and replaced with mortar. Initial floating shall produce a surface of uniform texture and appearance with no unnecessary working of the surface with the float.

The initial floating shall be followed with a second floating at the time of initial set. The second floating shall produce a smooth, uniform, and workmanlike float finish of uniform texture and color. Unless additional finishing is specifically required, the completed finish for all unformed surfaces shall be a float finish as produced by the second floating.

Floating shall be performed with hand floats or suitable mechanical compactor floats.

Any surfaces designated on the drawings to be troweled shall be steel trowel finished. Troweling shall be performed after the second floating when the surface has hardened sufficiently to prevent an excess of fines being drawn to the surface. Troweling shall produce a dense, smooth, uniform surface free from blemishes and trowel marks.

3.16. Clean-Up

All forms shall be completely removed. All materials, equipment, and rubbish shall be removed and the premises left in a neat condition.

3.17. Repairing Defective Concrete

Defects in formed concrete surfaces shall be repaired to the satisfaction of the Owner within 24 hours, and defective concrete replaced within 48 hours after the adjacent forms have been removed. All concrete that is porous, honeycombed, or otherwise defective to a depth in excess of 1 inch shall be cut out and removed to sound concrete, with edges square cut to avoid feathering. Surfaces shall be coated with epoxy bonding compound before the repair concrete is placed.

Concrete repair work shall be performed in a manner that will not interfere with thorough curing of surrounding concrete. Mortar and concrete used in repair work shall be adequately cured and finished to match adjacent surfaces.

4.0 References

4.1. American Concrete Institute

1. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials
2. ACI 318 – Building Code Requirements for Structural Concrete and Commentary
3. ACI 301 – Specifications for Structural Concrete
4. ACI 305R –Hot Weather Concreting
5. ACI 306R –Cold Weather Concreting
6. ACI 308R – Guide to Curing Concrete
7. ACI 336.1 – Specification for the Construction of Drilled Piers
8. ACI 347 – Guide to Formwork for Concrete
9. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures and Commentary

4.2. ASTM International

1. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
2. ASTM A706 – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
3. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
4. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
5. ASTM C33 – Standard Specification for Concrete Aggregates
6. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
7. ASTM C42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
8. ASTM C94 – Standard Specification for Ready Mixed Concrete
9. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
10. ASTM C150 – Standard Specification for Portland Cement
11. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete
12. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete
13. ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
14. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

15. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete
16. ASTM C403 – Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance
17. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete
18. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
19. ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete
20. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

4.3. **American Welding Society**

1. AWS D1.1-Structural Welding Code-Steel

APPENDIX B

SUBMITTAL LOG

PRINT DATE: 5/10/2023

Project Submittals

Owner: PWC Fayetville
Contractor:
Project: PO HOFFER Substation
Scope: Foundations and Oil Containment

DESCRIPTION	SUBM. #	RECEIVED	REJECTED	APPROVED	NOTES
Concrete					
Pad Mix Design					
Pad Concrete Materials (Cement, Stone, etc.)					
Pad Admixtures (Air, Plasticizers, etc.)					
Pier Mix Design					
Pier Concrete Materials (Cement, Stone, etc.)					
Pier Admixtures (Air, Plasticizers, etc.)					
Reinforcement					
Curing Compounds					
Concrete Testing Firm with Contacts					
Geotechnical Firm with Contacts					
Oil Containment					
Reinforcement					
PVC Pipe					
Expansion Joints					
Reinforced Concrete Pipe					
Joint Sealants					
Ground Clamps					
Waterstop Materials					
Pump					
Oil Sensing Device					
Grading					
Materials					
Geotechnical Firm with Contacts					
Grating					
Grating Materials					
Support Materials					
Support layout					
Grating Layout					

6

Technical Specifications
Structures & Equipment

PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA

STRUCTURES AND EQUIPMENT FOR
PO HOFFER SUBSTATION

TECHNICAL SPECIFICATIONS

1.0 Scope

Public Works Commission of Fayetteville, North Carolina, is procuring materials for the installation of the PO HOFFER Substation. These Technical Specifications describe the structural materials, equipment, and the associated components for the installation of these facilities.

The Bidder's work shall include furnishing all equipment and materials so represented by the Bill of Materials, the accompanying Drawings, these Technical Specifications, and as set forth in the Bid Schedule. The Owner reserves the right to select any combination of alternate schedules as may be allowed. The Owner also reserves the right to reject any or all bids.

The Bill of Materials supplied with these Specifications represents the type of materials to be supplied. The Bidder has the responsibility of furnishing the quantity, all mounting hardware, and miscellaneous other materials necessary for a complete and functional substation, except for items designated to be furnished by Owner.

2.0 General Information

These Specifications describe the type, size, and characteristics of the various materials and equipment required to be furnished. The Drawings indicate general arrangement, equipment location, and spacing.

Strict adherence to these general Specifications and Drawings is requested to facilitate checking and consideration of the Proposal.

Proposals shall include the following:

2.1. Catalog numbers, manufacturer, ratings, characteristics, types, sizes, etc., of all materials and equipment included. A simple statement that all necessary materials and equipment will be provided is not satisfactory. A List of Materials is included at the end of these Specifications for providing this information.

2.2. Proposal for the substation shall include all materials and equipment required for a complete and coordinated substation. The Successful Bidder shall submit along with his quotation a complete list of materials to be furnished for the substation.

2.3. Prices shall include the cost of delivery to Fayetteville, North Carolina.

2.4. Coordinated shipment shall be made to reduce storage by Contractor and to facilitate the accumulation of component parts. Small piecemeal shipments will not be accepted. The number of shipments shall not exceed five (5) unless approved by the Owner. Direct-manufacturer, factory-drop shipments shall not be accepted.

2.5. All components in the steel package shall be distinctly marked or identified and shall be completely assembled before shipment, insofar as is practical. Each Bidder shall so state in his Proposal the manner in which trusses and columns will be shipped.

2.6. The Bidder shall furnish specification sheets (and installation manuals when required) for all switches, connectors, fittings, insulators, and lightning arresters not explicitly called out in the approved Bill of Materials. These specification sheets shall be provided with the approval drawings.

2.7. Any design work performed by the Bidder shall be sealed by a Professional Engineer registered in the State where the project is located.

3.0 Special Conditions

3.1. Material Shipments

The structures, crates, pallets, boxes, packing lists, etc. shall be maintained and clearly marked to correspond appropriately with the correct project.

3.2. Defective Materials, Equipment, and Workmanship

All materials and equipment furnished hereunder shall be subject to the inspection, tests, and approval of Owner; and the Bidder shall furnish all information required concerning the nature or source of any materials and equipment and provide adequate facilities for testing and inspecting the materials and equipment at the plant of the Bidder.

The materials and equipment furnished hereunder shall become the property of Contractor when delivered at the point to which shipment is to be made; provided, however, that Contractor may reject any such materials and equipment as does not comply with the Specifications for materials and equipment and warranties of the Bidder and manufacturers. Recognition and subsequent rejection of any defective materials and equipment may occur either before or after incorporation of such materials and equipment into the facilities, provided such rejection is made within one (1) year of date of delivery of the materials and equipment. Upon any such rejection, the Bidder shall replace the rejected materials and equipment with materials and equipment complying with the Specifications for materials and equipment and warranties FOB open-top truck or open trailer at suitable destination as determined by Contractor. Contractor shall return the rejected materials FOB open-top truck or open trailer at the same destination. In the event of the failure of the Bidder to so replace rejected materials and equipment, Contractor may make such replacement; and the cost and expense thereof shall be paid by and be recoverable from the Bidder.

3.3. Miscellaneous

The Bidder shall hold harmless and indemnify the Owner, its agents, and employees from any and all claims, suits, and proceedings for infringement of any patent or patents covering materials and equipment purchased hereunder. The Bidder shall defend any suit or proceeding brought against Owner, its agents, or employees based upon a claim that the materials and equipment, or any part thereof, constitute an infringement of any patent; or if the Bidder shall fail to defend such suit or proceeding, Owner may do so, and the Bidder shall make reimbursement for the expense of such litigation. If the materials and equipment, or any part thereof, are held to constitute infringement and the use thereof is enjoined, the Bidder shall, at its own expense, either procure for Owner the right to continue to use the materials and equipment, or such part thereof, or shall replace the materials and equipment, or such part thereof, with non-infringing materials and equipment.

4.0 Standards

4.1. All equipment and materials covered by these Specifications shall be in accordance with the applicable provisions of the latest editions of the Standards of the ASTM, ANSI, NEMA, IEEE, OSHA, RUS, and latest revision of the NESC. Where a manufacturer's name and type of equipment is indicated in the Specifications, it is for clarity and the establishment of a standard and is restrictive unless use of an approved equal is specifically mentioned.

The Bidder may offer alternate pricing for equivalent items by other manufacturers. However, all base bids must explicitly comply with the designated materials specified herein. The Owner may elect to purchase alternates, as proposed by the Bidder. The alternate materials are subject to review and approval by the Owner.

The basic system ratings for the substations shall be as follows:

System High-Side Voltage	69,000 volts, three-phase wye, Basic Insulation Level shall be 350 kV, 60 Hertz.
System Low-Side Voltage	25 kV at 150 BIL, 60 Hertz operated at 25 kV
Transformer Capacity	One (1) substation class power transformer rated 67 to 26.18 x 13.09 kV, rated 20/26.7//33.3.0 MVA, ONAN/ ONAF/ ONAF (55°C).
Structural Design	Medium Loading District, plus allowance for 0.50 inches of ice and 90 mph. wind with 150 mph. gusts.
Primary Bus and Secondary Bus	Strength requirements to match weight of equipment, ice, and wind loadings.
Incoming Circuit	2,500 lbs. factored per 69 kV phase conductor design tension, 1,500 lbs. unfactored per static conductor, +/- 15° take-off angle in any direction
Outgoing Circuits	Underground
69 kV Power Circuit Breaker	48 volt dc and 120/240 volt ac single-phase
Transformer	48 volt dc and 120/240 volt ac single-phase
Bus & Feeder Circuit Breakers	48 volt dc and 120/240 volt ac single-phase
Protective Relaying Panels	48 volt dc and 120/240 volt ac single-phase

5.0 Drawings and Documentation

5.1 Conceptual Design
The work shall conform to the Booth & Associates, Inc. Drawings listed in the Appendices, all of which form a part of these Specifications.

5.2 Load Calculations
The Commission's Engineer will prepare calculated loading reactions.

5.3 Design and Fabrication Drawings
The Commission's Engineer will prepare all Shop Drawings and Bill of Materials.

5.4 Bus Cutting Schedule
The Bidder shall provide a bus cutting schedule to demonstrate the bus quantity and be used by the construction contractor.

6.0 Structural Steel

6.1. The substation structures to be included in the Form of Proposal shall conform to the following specifications and are identified on the appropriate substation project drawing.

The Substation Structures are to include:

1) 69 kV, 4-inch diameter IPS aluminum bus and bus supports
2) 69 kV line A-frame terminating structure with 69 kV group-operated disconnect switches
3) Two (2) 69 kV group-operated switch structures
4) 85-foot direct embedded steel static masts, (one (1) required)
5) 25 kV, 6-bay underground feeder distribution structure

6.2. Specifications for the fabrication, erection and shipping of structural steel can be found in the Appendices of this specification.

7.0 Lightning Protection Structures

7.1. Lightning masts shall be one-inch diameter galvanized steel pipe capped at top end, of required length, and shall extend a minimum of ten feet (10') above the structure as shown on the Drawings. Lightning masts shall be supplied with mounting provisions for

attachment to the steel columns of the substation structures. Lightning mast ground clamps shall be included for attachment of 2/0 AWG copper-clad steel leads as defined in **Section 12.0 Connectors**.

7.2. One (1) hot-dip galvanized steel pole shall be provided by the Bidder for primary bus static protection. The static pole shall be two-piece units and shall be 85'-0" in length (for 10'-0" embedment), furnished complete with 10'-0" static rod designed for top mast mounting, for a total height of eighty-five feet (85') above-grade. The poles shall be equipped with Aeolian vibration suppression, service hand-hole, below-grade cable entrance slot, NEMA 2-hole pads for grounding, and two (2) floodlight brackets, as indicated on the Drawing details. The Bidder shall provide all mounting hardware, conductor, and connectors to complete assembly of the static masts per the Detail Drawings.

8.0 Miscellaneous Structures / Hardware

8.1. A switch grounding platform used for protecting the switch operator in the event of a fault at the switch during manual operation shall be furnished for each group-operated switch. The platform shall be open-grating design with the grounding connector locations on opposite corners for attachment of 2/0 AWG copper as shown on the drawings.

8.2. Miscellaneous fastener hardware shall conform to the industry standards for the purpose for which they are to be used. Bolts, nuts, and washers for structural steel shall be hot-dip galvanized. Hardware shall be of low-alloy, corrosion-resistant steel, ASTM Specification A242.

All quantities of fastener hardware shall be shipped with a **minimum of ten percent (10%) overcount** above the designated quantity necessary for assembly.

9.0 Insulators

All insulators shall be wet-processed porcelain colored sky gray, shall conform to the IEEE Standards for insulators, and shall have the following minimum electrical mechanical characteristics:

9.1. Bus Insulators

Bus insulators for supporting bus and leads shall be standard station post non-stacking or uniform-diameter stack type meeting ANSI-BIL units complete with connectors, bolts, and washers as required:

Voltage Rating	25 kV	69 kV
BIL	150 kV	350 kV
Impulse Flashover-Positive	170 kV	390 kV
Low Frequency Withstand-Wet, 60 cycle	60 kV	145 kV
Leakage Distance, Inches	24	72
Mechanical Strength Tension Pounds	10,000	16,000
Insulators per Stack	1	1
Bolt Circle	3"	3"
Technical Reference Number	TR 208	TR 216

Bus insulators shall be as manufactured by Lapp, Locke, Newell, or approved equal.

10.0 Bus and Leads

The Drawings include a sheet of details to indicate the several methods to be used for connecting and supporting the bus and leads. The conductors shall be provided with the necessary supports and connectors as illustrated by these details. The hardware required for the conductor and overhead ground wire attachments shall be furnished by the Bidder and shall conform to the

following specifications: ANSI C135 for bolts, ASTM A36 for steel, ASTM A47 for malleable iron and ASTM A153 for galvanizing. All hardware supplied shall be hot-dipped galvanized.

Bus and leads shall be as follows:

10.1. Primary rigid bus, 69 kV: 4-inch aluminum tubing, alloy 6063-T6, Schedule 40, with single conductor 336.4 kcmil ACSR internal damping cable.

10.2. Leads to and from 69 kV Breaker: 477 AAC.

10.3. Leads from 69 kV bus to transformer primary: 477 AAC, 19 strand.

10.4. Leads from the 67 to 26.18kV transformer secondary to secondary bus: Dual 954 AAC.

10.5. Secondary rigid bus, 25 kV, main bus - 3-inch and transfer bus - 2-inch: aluminum tubing, alloy 6063-T6, Schedule 40, with single conductor 336.4 kcmil ACSR internal damping cable.

10.6. Leads to and from feeder breakers: Single 954 AAC.

10.7. Surge arrester leads: 69 kV leads on 67 to 26.18 kV transformer mounted units: 477 AAC, via bolt-on tee. 25 kV leads on 67 to 26.18 x 13.09 kV transformer mounted units: 954 kcmil AAC via bolt-on tee to 954 kcmil AAC. 25 kV leads on outgoing distribution circuits: #2 AWG solid tinned copper.

10.8. Ground grid bus: 4/0 AWG S.D. bare copper, 7-strand.

10.9. Equipment and structure ground bonding leads:
   a. Connections extending below grade shall have 2/0 or 4/0 S.D. bare copper, 7-strand.
   b. Connections and runs existing only above grade shall be 2/0 AWG 40% conductivity 7-strand copper clad steel.

10.10. Transformer neutral and tank bonds: Single or parallel 2/0 or 4/0 S.D. bare copper, 7 strand.

10.11. Fence ground leads: #2 AWG copper clad.

11.0 Bus Supports

All substation tubular bus shall be supported by either fixed, slip-fit, or expansion attachment to the station post insulators using aluminum weldment tube to insulator fittings, as indicated on the Drawings. Bus supports shall be radio noise-free, equal to Travis.

12.0 Connectors

Connectors shall be suitable for the purpose they are intended and shall provide a sound electrical and mechanical connection.

The Bidder is responsible for supplying the connectors and hardware for all bus and leads and as defined in **Section 10.0 Bus and Leads** and shown on the Drawings. A corrosion-inhibiting compound shall be furnished in a sufficient quantity to be applied to all connections. Non-gritted, Anderson Type VS compound shall be used on all bolted connections. Gritted, Anderson Type VSG compound shall be used on all compression connections.

12.1. All connector fittings to the tubular bus shall be aluminum weldment type as manufactured by Travis, unless otherwise shown in the Bill of Material.

12.2. Cable terminal fittings required for the incoming lines, bus leads around switches, equipment, and between switches and rigid bus shall be aluminum bolted or compression type or bolted bronze type with the appropriate 2-hole or 4-hole NEMA spacing pad, as manufactured by Travis, unless otherwise shown on Bill of Material.

12.3. Expansion terminal connectors for tubular bus shall be aluminum weldment type for various locations as shown on the Drawings and as manufactured by Travis, unless otherwise shown on Bill of Material.

12.4. Grounding clamp connectors will be required for supporting or bonding the grounding cable to steel columns, beams, lightning masts, and/or fence/fabric posts. Supporting

grounding clamp connectors will be required every four feet (4') minimum for columns and beams to minimize the sag in the cable.

12.5. A copper to aluminum bimetallic transition plate shall be provided for all non-similar connections between terminal connections on all equipment, including transformers, breakers, and switches to bus leads, where it is necessary to make an aluminum-to-copper connection. The transition plates shall be equal to Travis Type TP.

12.6. All hardware supplied for bolted aluminum-to-aluminum electrical fittings shall be stainless steel, 18-8 alloy.

12.7. All hardware supplied for bolted aluminum-to-copper electrical fittings shall be stainless steel 18-8 alloy.

12.8. All hardware supplied for bolted copper-to-copper electrical fittings shall be stainless steel 18-8 alloy.

12.9. All quantities of fastener hardware shall be shipped with **a minimum ten percent (10%) over count** above the designated quantity necessary for assembly.

12.10. Bidder to verify that all conductor terminal pads shall **match and fit onto switch terminal pads** with regard to pad size, NEMA rating and pad shoulder configurations.

13.0 Group-Operated Disconnect Switches

13.1. Switch Construction

The switches shall meet all applicable ANSI and other industry mechanical and electrical standards and shall be completely assembled and adjusted at the factory. The switches shall be of the manual-operating type by means of an operator pipe handle, and all parts of the operating mechanism shall be furnished for installing the complete three-phase switch and mechanism on the supporting structure. The switches shall be physically sized to fit properly in the locations shown on the Drawings. Switches shall be suitable for either horizontal or vertical mounting. A galvanized steel double-channel base plate shall be furnished and drilled for the particular installation prior to galvanizing.

The switches shall be of copper or aluminum construction with tin-plated copper contacts for both the center contacts and the hinge contacts.

All switches shall be complete with stainless steel arcing horns, pipe handle operating mechanism for manual operation, outboard bearings guide plate, operating pipe, and flexible grounding braid, an open- and closed-position indicator, and provisions for pad-locking in either the open or closed position. Oilite bearings shall be used for moving parts not provided with greaseless ball-bearing assemblies having stainless steel balls and races. Bearings shall be permanently sealed and require no greasing or other field maintenance. The switches shall be designed such that when they are fully open to ninety degrees (90°), the metal-to-metal spacing to the adjacent phase will not be less than specified for each voltage class. Switch terminals shall be provided with 4-hole NEMA spacing electro tin-plated terminals for copper or aluminum conductor connections as per the Drawings.

The switch insulators shall be ANSI No. 70 sky gray standard or high strength, non-tapered, uniform-diameter stacks, station post with three or five inch (3-inch or 5-inch) diameter bolt circles both top and bottom. The switch shall be two (2) or three (3) insulators per pole, as indicated on the Drawings. The switch insulators shall be free to rotate without affecting the position of the terminal pads.

13.2. Ratings for 69 kV Group-Operated Switches

13.2.1. Vee-type, center-break, group-operated air-break switch located on the A-frame shall be outdoor type, two-insulator, group-operated, air-break disconnect, complete with arcing horns, operating mechanism for pipe operation, outboard bearing, and guide plate. Oilite bearings shall be used for moving parts not provided with greaseless ball-bearing assemblies having stainless steel balls and

races. Terminals shall be tin-plated NEMA four-hole suitable for bronze or aluminum conductor connectors as per the Drawings. High-side switches shall be 69 kV nominal, 350 kV BIL, 1200 Ampere continuous, 61,000 Ampere momentary. Switches shall be completely assembled with TR 216 standard strength post insulators.

13.2.2. Vertical break, group-operated air break switches located on the 69kV bus shall be outdoor type, three (3) insulator, group operated, air-break disconnect, complete with arcing horns, operating mechanism for pipe operation, outboard bearing, and guide plate. Oilite bearings shall be used for moving parts not provided with greaseless ball-bearing assemblies having stainless steel balls and races. Terminals shall be tin-plated NEMA four-hole suitable for bronze or aluminum conductor connectors as per the Drawings. High-side switches shall be 69 kV nominal, 350 kV BIL, 1200 Ampere continuous, 61,000 Ampere momentary. Switches shall be completely assembled with TR 216 standard strength post insulators.

13.3. Ratings for 25 kV Group-Operated Switches

13.3.1. Vee-type center-break disconnect switches located on the 25 kV main secondary bus shall be rated 27 kV, 150 kV BIL, 2000 Amperes continuous, 80,000 Amperes momentary, **completely assembled** with TR-208 standard-strength, post insulators with pipe handle manual operator mechanism.'

13.3.2. Vee-type center-break disconnect switches located on the 25 kV transfer bus shall be rated 27 kV, 150 kV BIL, 1200 Amperes continuous, 61,000 Amperes momentary, completely assembled with TR 208 standard strength post insulators with pipe handle manual operator mechanism.

13.4. Approved Switch Manufacturers and Alternates

All bids for substation structures and equipment shall incorporate only switches as approved and noted herein. The Bidder may offer an alternate quotation for an alternate switch. **However, all base bids must include the type of switch so designated below.**

13.4.1. 69 kV, 1200 Ampere group-operated switches per Section 13.3.1:
All Base Bids: Cleaveland-Price C26A018G01 / CB-AV or approved equivalent

13.4.2. 69 kV, 1200 Ampere group-operated switches per Section 13.3.2:
All Base Bids: Cleaveland Price C06A032G22 / V2-CA or approved equivalent

13.4.3. 25 kV, 2000 Ampere vee-type center-break group-operated switches per Section 13.4.1:
All Base Bids: Cleaveland Price C26A39G02 / CB-CV or approved equivalent

13.4.4. 25 kV, 1200 Ampere vee-type center-break group-operated switches per Section 13.4.2:
All Base Bids: Cleaveland Price C26A038G02 / CB-CV or approved equivalent

14.0 Surge Arresters

Surge arresters for the high- and low-voltage sides for the power transformers will be provided by the power transformers manufacturer, as furnished by the Owner.

Surge arresters on the incoming 69 kV A-Frame shall be furnished by the Bidder and shall be surge type, sky gray metal oxide, base-mounted, polymer, Station Class rated as follows:

Nominal Voltage	MCOV Arrester Rating	Location	Class	Type
69 kV	48 kV	69 kV A-Frame	Station	EVP

Surge arresters for the 25 kV circuit exits shall be furnished by the Bidder and shall be surge type, polymer, sky gray, metal oxide, Station Class rated as follows:

Nominal Voltage	MCOV Arrester Rating	Location	Class	Type
13.2/7.2 kV	8.4 kV	15 kV Circuit Exits	Station	EVP

Metal oxide surge arresters are rated in terms of maximum continuous operating voltage (MCOV). However, metal oxide arresters which are given conventional ratings may be furnished if the MCOV equivalent ratings are as specified here.

The 48 kV MCOV station class surge arresters shall be provided with a 4-hole NEMA spacing terminal on the line-side bushing terminals and ground connectors suitable for a maximum 250 kcmil copper (loop configuration) on the arrester base. The distribution structure MCOV station class arresters shall include line and ground connectors for up to #2 stranded tinned copper.

The surge arresters shall comply with ANSI Standard C-62.1.

15.0 Single-Pole Disconnect Switches

The switches shall be outdoor type, meet all applicable ANSI, NEMA and other industry mechanical and electrical standards, and shall be completely assembled and adjusted at the factory. The switches shall be physically sized to fit properly in the locations shown on the Drawings. Switches shall be suitable for either horizontal or vertical mounting, as shown on the Drawings. A galvanized steel channel base plate shall be furnished and drilled for the particular installation prior to galvanizing.

The switches shall be of copper construction with electro tin-plated contacts for both the jaw and the hinge contacts. The switch terminals shall be provided with 2-hole or 4-hole NEMA spacing, electro tin-plated terminals for copper or aluminum conductor connectors as per the Drawings.

Bidder to verify that all conductor terminal pads shall **match and fit onto switch terminal pads** with regard to pad size, NEMA rating and pad shoulder configurations.

The power fuses shall be outdoor type, meet all applicable ANSI, NEMA and other industry mechanical and electrical standards, and shall be completely assembled at the factory. Fuse mounting hardware shall consist of the base, insulators, complete upper and lower contact assemblies, terminal connectors sized for specified cable as shown on the Drawings, and fuse unit end fittings. The mounting shall be suitable for vertical offset or inverted installation.

The 25 kV switch and fuse insulators shall be ANSI No. 70 sky gray, post type, TR-208 standard strength (or TR-227 high-strength, as required), with three or five inch (3-inch or 5-inch) diameter bolt circles both top and bottom. The switches shall be shipped completely assembled on bases with post insulators oriented to accommodate the appropriate mounting location.

15.1. Hookstick Switches

High-side switches shall be 69 kV nominal, 350 kV BIL, 1200 Ampere continuous, 61,000 Ampere momentary. Switches shall be completely assembled with TR 216 standard strength post insulators. Switches shall be Cleaveland-Price model C102A150G17 Type LCO-C or approved equivalent.

Single-pole hookstick disconnect switches shall be provided for isolation of the 25 kV feeder vacuum circuit breakers, and shall be rated 27 kV, 150 kV BIL, 1200 Amperes continuous, 61,000 Amperes momentary. The 27 kV, 1200 Ampere hookstick disconnect switches shall be Cleaveland-Price model C102A230G08 Type LCO-C or approved equivalent.

15.2. Fuses and Fuse Mounting Hardware

Fuses, fuse barrels and fuse mounting hardware shall be provided for isolation of the 25 kV station service transformers and potential transformers. One (1) fuse (and end fittings) of

the proper rating shall be supplied with each mounting, plus additional spares, as specified on the Bill of Materials.

15.2.1. Fuses and mountings to be provided for the station service transformers shall be rated similar to S & C Type SMD-20 power fuse equipped with a current limiting fuse or approved equal.

15.2.2. Fuses and mountings to be provided for the potential transformers shall be rated similar to S & C Type SMD-20 power fuse equipped with a current limiting fuse or approved equal.

15.2.3. Current limiting fuses shall be Type "K-Mate" 50,000 A.I.C., rated 12 Amperes, or approved equal.

15.2.4. Insulators for fuse mounting shall be rated for 25 kV, TR-208.

16.0 Hookstick and Container

One (1) station class hookstick shall be provided as follows: one (1) sixteen-foot (16'), fiberglass stick similar or equal to Hastings 541-16. An appropriate length storage container, along with fence mounting kit shall be supplied with each hookstick.

17.0 Instrument Transformers

Potential transformers (PTs) shall be provided by the Bidder for use of metering the medium voltage bus. PTs shall be outdoor type, metering class, single primary, tapped secondary, 60 cycle, dual bushing.

The PTs shall be ABB Type PTT-110-977 or ABB Type VOZ-11 or approved equal.

18.0 Distribution Transformers

The Owner will supply one (1) 120/240 volts distribution transformers to supply ac station service for the substation equipment in the 69 to 25 kV Substation.

The Bidder shall provide mounting provisions for this transformer on the structure in the location as shown on the Drawings included with these Specifications. The Bidder shall assure the mounting clearance between the transformer's primary insulator and the power fuse mounting base or truss exceeds the minimum clearance requirements of the National Electrical Safety Code. The Bidder shall also assure that National Electrical Safety Code requirements are met for minimum distance to the ground for personal safety.

All transformers utilize an industry standard hanger bracket with two (2) 5/8" (5/8") bolts in-line on eleven and one quarter-inch (11-1/4") spacing.

19.0 Station Grounding

a. The station grounding below grade conductors shall be provided by the Contractor as follows: Ground grid bus: 4/0 AWG bare SD copper, 7-strand, 2/0 AWG bare SD copper, 7-strand for perimeter conductor

b. The fence grounding conductors shall be provided by the bidder as follows: Fence ground leads: #2 AWG bare SD copper clad.

c. Equipment and structure ground bonding leads:
   1) Connections extending below grade shall have 2/0 or 4/0 S.D. bare copper, 7-strand.
   2) Connections and runs existing only above grade shall be 2/0 AWG 40% conductivity 7-strand copper clad steel.

d. The transformer ground bonding leads shall be provided by the Contractor as follows: Dual 4/0 AWG, SD copper, 7-strand.

e. Ground rods shall be provided by the Contractor and shall be Copperweld three-fourths inch (3/4") diameter, ten feet (10'-0") in length, of the sectional type. Ground rod

connections shall be Cadweld type, suitable for 4/0 AWG copper ground bus. Drive heads and couplings shall be furnished with the sectional rods.

f. All connections below grade shall be Cadweld and shall be provided by the Contractor.

g. All fence grounding connectors as shown in the Bill of Materials shall be provided by the Bidder.

20.0 List of Materials – Substation Structures and Equipment

A list of the major items required for the substation is included in the appendices. Items noted as "(N/A)" in the list are to be furnished by Owner.

7

Technical Specifications
Structural and Tubular Steel

PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA

STRUCTURAL AND TUBULAR STEEL
SPECIFICATIONS FOR
PO HOFFER 69 X 25 X 15 kV SUBSTATION

ISSUED FOR BID

PUBLIC WORKS COMMISSION
FAYETTEVILLE, NORTH CAROLINA

STRUCTURAL AND TUBULAR STEEL SPECIFICATIONS FOR PO HOFFER 69 X 25 X 15 kV SUBSTATION

Booth & Associates, LLC
Consulting Engineers
2300 Rexwoods Drive, Ste. 300
Raleigh, North Carolina 27607
Firm License No.: F-0221

TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS

1.0 General

1.1 Construction documents including all design drawings and specifications of all disciplines complement each other and shall be read and interpreted collectively.

1.2 Where a conflict or conflicts are found between construction documents, then the conflict shall be brought to the attention of the Engineer, in writing, for resolution.

1.3 The structural steel fabricator shall be responsible for coordination between the requirements of the structural steel design drawings, the electrical general arrangement plans, and the equipment mounting requirements.

1.4 Where equipment mounting locations and/or elevations are shown on the structural steel drawings, then adjustment of such locations or elevations to match the mounting and/or clearances requirements are allowed provided this adjustment does not exceed 6 inches in any one location, and provided such adjustment does not create conflict(s) with structural steel members or connections. Where more adjustment is needed, it shall be referred to the Engineer for resolution and approval before fabrication.

1.5 Where equipment mounting locations and/or elevations are shown on the structural steel drawings, then adjustment of such locations or elevations to match the mounting and/or clearances requirements are allowed provided this adjustment does not exceed 6 inches in any one location, and provided such adjustment does not create conflict(s) with structural steel members or connections. Where more adjustment is needed, it shall be referred to the Engineer for resolution and approval before fabrication.

1.6 This specification covers detailing, furnishing, fabrication, painting/galvanizing and delivery of all structural/miscellaneous steel, tubular steel, and aluminum/steel/fiberglass grating as shown on the drawings.

1.7 All work, including workmanship, pertaining to this specification shall be done in accordance with the reference standard revisions in effect at the time of contract award.

1.7.1 AISC American Institute of Steel Construction (AISC), *Specification for the Design, Fabrication and Erection of Structural Steel for Buildings*, latest edition.

1.7.2 American Society of Civil Engineers (ASCE) Standard, *Design of Steel Transmission Pole Structures*, Manual 48, latest edition.

1.7.3 American Welding Society (AWS), *Structural Welding Code*, AWS D1.1, latest edition.

1.7.4 Steel Structure Painting Council (SSPC), *Surface Preparation Specification*, SSPC-SP6, latest edition.

1.7.5 American Society for Testing and Materials (ASTM), various standards, latest version.

1.7.6 American National Standards Institute (ANSI), *National Electrical Safety Code*, ANSI C2, latest edition.

2.0 Materials

2.1 All structural shapes shall be conforming to ASTM A992 except for channels, angles, and plates which shall conform to ASTM A36.

2.2 Structural steel pipe shall conform to ASTM A53, Type E or S, Grade B, unless otherwise shown on the drawings.

2.3 Structural square and rectangular tubing shall conform to ASTM A500, Grade B.

2.4 Steel for tapered columns shall conform to ASTM A572, unless otherwise shown on the drawings.

2.5 Anchor bolts shall conform to F1554 Standard Specification for Anchor Bolts, grade 36, 55, and 105 ksi yield strength as specified on the drawings. Each anchor bolt shall be furnished with washers and nuts. Nuts shall be of equivalent strength to the ASTM A563 Heavy Hexagon specification. Washers shall adhere to ASTM F436 Extra Thick, unless otherwise shown on the drawings.

2.6 Bolts, except for anchor bolts, shall conform to ASTM F3125, A325 Type I. Nuts shall conform to ASTM A563 and shall be of grade and style suitable for use with bolts supplied. Galvanized nuts shall be grade DH. Washers shall conform to ASTM F436, unless otherwise shown on the drawings.

3.0 Structural Steel Details and Fabrication

3.1 Fabrication and workmanship shall conform to the AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, unless otherwise specified.

3.2 Welding shall be performed by qualified operators using procedures in accordance with AWS D1.1 and using E70XX electrodes. All surface areas to be welded shall be cleaned completely of rust, scales, oil or grease, and any other foreign matter. Welds which do not exhibit a neat, smooth appearance shall be ground smooth.

3.3 Structures shall be hot-dip galvanized after fabrication, unless otherwise shown on the drawings.

3.4 All structural steel bolts shall be minimum five-eighths inch (5/8”) diameter, unless otherwise shown on the drawings.

3.5 The maximum size of bolts to be used in any section, clearances, edge distance, and general structural practice not definitely stated in the Specifications shall be in accordance with the standard of the latest edition of the American Institute of Steel Construction.

3.6 All anchor bolts required for the installation of the structures shall be furnished by the Manufacturer. Anchor bolts shall be hot-dip galvanized, complete with two (2) heavy hex nuts and extra thick flat washers for leveling, unless otherwise shown on the drawings.

3.7 All parts of the structure shall be neatly finished. All members shall be free from kinks, twists, bends, or open joints. All members that are bent or out of line after galvanizing shall be carefully straightened with a straightening roll or straightening machine. The use of sledges in straightening bent material or other methods in which the material or its finish may be mutilated shall not be allowed.

3.8 All nuts shall be readily accessible to a wrench for adjustment. Bolts shall not be flushed but shall project approximately one-fourth inch (1/4-inch) beyond the face of the nuts. Nuts shall fit the shanks so that they may be screwed on with the fingers and at the same time not fit so loosely that the value of the bolts acting with the tension of the head of the nut will be reduced.

3.9 All steel members shall be clearly marked to provide easy identification in the field. **Trusses and box columns up to, and including, four feet by four feet (4'-0" x 4'-0"), shall be assembled before shipment to ensure correctness, and shall be shipped assembled.** If the Manufacturer does not intend to ship the trusses and box columns completely assembled, he shall so state in the quote. Markings on component parts shall indicate the structure to which they apply.

3.10 Sectional members combined to form columns of the required height will not be accepted. Angles for column legs must be continuous to provide the necessary height.

3.11 Continuous punching of steel sections for equipment mounting is not acceptable. Holes shall be provided as needed for erection and equipment installation, but unnecessary holes will not be accepted.

3.12 If any material whatsoever in any state of completion is found defective as to workmanship, details, or materials or is contrary to the design for these specifications, it shall be rejected. This rejection may take place at the rolling mills, fabricating plant, galvanizing plant, or at the site of the structure. Any rejected materials shall be replaced without any expense whatsoever to Owner.

4.0 Tubular Steel Structure Details and Fabrication

4.1 Lifting lugs are optional. The manufacturer shall supply all instructions for handling and erection of poles and arms.

4.2 Each pole shall be permanently marked on the pole shaft seventy-two inches (72″) above ground line and on the bottom of base plate or bearing plate with the following identifying information:

a. Manufacturer's Identification

b. Structure Type

c. Height and Class

d. Structure Number

e. Ultimate Ground Line Moment

f. Owner's Name

g. Date Manufactured

The method of identification shall be approved by the Owner. In addition, there shall be clear indication or marks for handling or sling points, storage rack points, and lifting joints for standing the pole and vibratory pole base.

4.3 All welding shall be in accordance with the American Welding Society Code AWS D1.1, latest edition. Welders shall be qualified in accordance with AWS .1 welding procedures.

4.4 One hundred percent (100%) penetration welds shall be required in, but not limited to, the following areas:

a. circumferential welds (C-welds) joining structural members,

b. longitudinal welds in the female portion of the joint within the slip joint area,

c. welds at the butt joints of back-up strips,

d. base plate to shaft weld,

e. longitudinal welds for a minimum length of three inches (3″) where there are adjacent C-welds, flange welds, base welds and ends of tubes.

4.5 Full penetration or equivalent ninety percent (90%) partial penetration with fillet overlap shall be used for vang-to-plate shaft, and arm box joints.

4.6 Quality and acceptability of every inch of the full penetration welds shall be determined by visual and ultrasonic inspection.

4.7 All other penetration welds shall have sixty percent (60%) minimum penetration. Quality and acceptability of all welds other than full penetration welds shall be determined by visual inspection, supplemented by magnetic particle, ultrasonic or dye penetrant inspection.

4.8 All weld back-up strips shall be continuous the full length of the welds. Care shall be exercised in the design of welded connections to avoid areas of high stress concentration which could be subject to fatigue or brittle fractures.

4.9 Field welding shall not be permitted except with the Engineer's and Owner's approval and with the manufacturer's direction in repairing a pole.

4.10 All parts of the structure shall be neatly finished and free from kinks or twists. All holes, blocks, and clips shall be made with sharp tools and shall be clean-cut without torn or ragged edges.

4.11 Before being laid out or worked in any manner, structural material shall be straight and clean. If straightening is necessary, it shall be done by methods that will not injure the metal.

4.12 Minimum plate thickness for all pole components shall be three-sixteenths inch (3/16″).

4.13 Shearing and cutting shall be performed carefully and all portions of the work shall be finished neatly. Copes and re-entrant cuts shall be filleted before cutting.

4.14 All forming or bending during fabrication shall be done by methods that will prevent embrittlement or loss of strength in the material being worked.

4.15 Holes for connection bolts shall be one-sixteenth inch (1/16″) larger than the nominal diameter of the bolts. Holes in the flange plates for bolted splices shall be one-eighth inch (1/8″) larger than the bolt diameter. Holes in the base plates for anchor bolts shall be three-eighths inch (3/8″) larger than the nominal diameter of the anchor bolts. The details of all connections and splices shall be subject to the approval of the Owner or his representatives.

4.16 Holes in steel plates which are punched must be smooth and cylindrical without excessive tear out or depressions. Any burrs that remain after punching shall be removed by grinding, reaming, etc.

4.17 Holes of any diameter may be drilled in plate of any thickness. Care shall be taken to maintain accuracy when drilling stacks of plates.

4.18 Holes may be made by use of a machine guided oxygen torch. Flame cut edges shall be reasonably smooth and suitable for the stresses transmitted to them.

4.19 The overall length of the assembled structure should not be less than six inches (6″) of the specified length and not more than twelve inches (12″).

5.0 **Finishes**

5.1 Galvanizing

5.1.1 Structures shall be hot-dip galvanized after fabrication, unless otherwise shown on the drawings.

5.1.2 Galvanizing shall conform to ASTM A123. Precautions shall be taken against embrittlement, warpage and distortion in accordance with ASTM A143 and A384.

5.1.3 Fasteners and anchor bolts shall be galvanized in accordance with ASTM F2329.

5.2 Coatings for Embedded Portion of Poles

5.2.1 A sixteen (16) mil (minimum dry film thickness), two (2) component hydrocarbon extended polyurethane coating that is resistant to ultraviolet light shall be applied on the exposed surface of the embedded portion of the pole. The coating shall extend from the butt to five feet (5′-0″) above ground line. Termination of coating at location above ground shall be feathered. Other coatings shall be approved by the Owner prior to their use.

6.0 Field Touch Up of Galvanized Surfaces

6.1 Structural steel shall be touched up with cold galvanizing compound so that all surfaces are completely protected and free of runs and sags.

6.2 All steel requiring touch-up shall be dry and free of all dirt, rust, oil, loose paint and other foreign material. Surfaces shall be prepared in accordance with Steel Structures Painting Council Specifications on Surface Preparation.

6.3 All steel surfaces or finish damaged during the material handling, installation or removal of various equipment shall be thoroughly cleaned, brushed and cold galvanized with inorganic zinc rich paint.

6.4 Approved inorganic zinc products:

6.4.1 Dimetcote 9, manufacturer: PPG Protective Coatings

6.4.2 Carbozinc 11, manufacturer: Carboline Company

6.4.3 Cathacoat 304V, manufacturer: ICI-DEVOE

6.5 All galvanized structural steel shall be repaired in accordance with ASTM A780.

7.0 Erection

7.1 Prior to the erection of structural steel, the Contractor shall measure all steel members in order to confirm that the material is in accordance with fabricator's shop drawings. Any items which require significant modification shall be reported to Booth and Associate's engineers immediately.

7.2 The Contractor shall be responsible for furnishing, installing, maintaining, and removing temporary structures required to support steel during erection.

7.3 No electrical equipment or cables shall be installed on any steel structure until all structural members have been completely erected and all fasteners properly secured to the specified torque.

7.4 All steel contact surfaces at connections shall be free of all scale, dirt, oil, etc.

7.5 All steel structures shall be plumb and level. Structural bolts shall not be tightened until all parts are installed in place. After steel is completely installed, bolts shall then be installed to final torque levels. Care shall be exercised to prevent kinking of steel members. Base plates for columns shall be leveled and installed using the double-nut method unless noted.

7.6 The Contractor shall take the necessary measures required to prevent any foreign material, such as mud, dirt, concrete splatter, etc., from accumulating on the stored materials. These measures shall include, but shall not be limited to, the use of timbers/pallets to elevate material above grade, covering an area of the initially graded substation yard with several inches of washed stone, the use of a storage trailer, or an enclosed structure.

8.0 Shipping Instructions

8.1 Material shall be carefully prepared for shipment so as to prevent damage to components and their protective coatings or loss of components.

8.2 Each shipment shall be accompanied by a checklist of all parts, identifiable by structure type and number. Bolts and miscellaneous hardware will be identified by the list for match up with the respective structure and shall be boxed or bundled. All parts required for any one structure shall be in one (1) shipment, if possible.

8.3 The manufacturer is responsible for repairing or replacing any structures which are delivered to the site with manufacturing errors. Repair and/or replacement costs shall include the structure itself, as well as any associated construction costs.

8.4 All materials shall be shipped to the jobsite by truck.

8.5 One full set of approved shop drawings, Erection Diagrams and Details, shall be shipped to the jobsite with the steel order.

9.0 **References**

9.1 ASTM International

1. ASTM A36-Standard Specification for Carbon Structural Steel
2. ASTM A53-Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless
3. ASTM A123-Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
4. ASTM A143-Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
5. ASTM F2329- Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
6. ASTM A384-Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing Steel Assemblies
7. ASTM A500-Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
8. ASTM A501-Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
9. ASTM A563-Standard Specification for Carbon and Alloy Steel Nuts
10. ASTM A572-Standard Specification for High-Strength Low-Alloy Columbium Vanadium Structural Steel
11. ASTM A780-Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
12. ASTM A992-Standard Specification for Structural Steel Shapes
13. ASTM F3125-Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength
14. ASTM F1554-Standard Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength

9.2 American Welding Society

1. AWS D1.1-Structural Welding Code-Steel

9.3 American Institute of Steel Construction

1. AISC 360 Specification for Structural Steel Buildings

8

Contractor-Furnished Cable Material List

CONTRACTOR-FURNISHED CABLE MATERIAL LIST

ITEM NO.	DESCRIPTION	SUPPLIER OR MFR.	CATALOG NO./TYPE
1	**SCADA CABLE** EPR/CPE shielded multi pair, #16 AWG, 600 volt, stranded tinned copper conductors, flame-retardant Ethylene Propylene Rubber (EPR) insulation, color coded per ICEA Method I: pairs-black/white with alpha numeric designation (1-ONE). Aluminum/polyester shield and stranded tinned copper drain wire, black sunlight -resistant flame-retardant Chlorinated Polyethylene (CPE) jacket, all per ICEA S-82-552 for Type TC cables. a. Three (3) pair twisted / shielded overall shield, #16 AWG	Anixter	2MR-1603 SPOS or equal
2	**CONTROL CABLE** EPR/CPE insulated general purpose control cable, 600 volt, stranded tinned copper conductors, Class B stranding (7 strands), 30 mils flame-retardant Ethylene Propylene Rubber (EPR) insulation color coded per ICEA Method 1, non-hygroscopic fillers with black flame-Retardant Chlorinated Polyethylene (CPE) outer jacket 45 to 80 mils as applicable, all per ICEA S-95-658/NEMA WC 70 for Type TC cables.		
	a. 2 conductor, #10 AWG, Color Table E-2, black, red	Anixter	2MR-1002 or equal
	b. 4 conductor, #10 AWG, Color Table E-1, black, white, red, green	Anixter	2MR-1004-1 or equal
	d. 4 conductor, #16 AWG, Color Table E-1, black, white, red, green	Anixter	2MR-1604-1 or equal
	e. 2 conductor, #16 AWG, Color Table E-2, black, red	Anixter	2MR-1602 or equal
	f. 12 conductor, #10 AWG, Color Table E-1	Anixter	2MR-1012 or equal
	g. 12 conductor, #14 AWG, Color Table E-1	Anixter	2MR-1412 or equal
3	**POWER CABLE** EPR/CPE power cable, 600 volt, stranded tinned copper conductors, Class B stranding flame-retardant Ethylene Propylene Rubber (EPR) insulation, color coded per ICEA Method 4 (printed numbers), non-hygroscopic fillers with black flame-retardant Chlorinated Polyethylene (CPE) outer jacket, all per ICEA S-95-658/NEMA WC 70 for Type TC cables.		
	a. 4 conductor, #8 AWG, Color Table E-1	Anixter	2MR-0804-1 or equal
	b. 3 conductor, #6 AWG	Anixter	3MR-0603 or equal

CONTRACTOR-FURNISHED CABLE MATERIAL LIST

ITEM NO.	DESCRIPTION	SUPPLIER OR MFR.	CATALOG NO./TYPE
	EPR/RHH power cable, 600 volt, stranded tinned copper conductors, Class B stranding flame-retardant and sunlight resistant Ethylene Propylene Rubber (EPR) insulation with hypalon (CSPE) outer jacket, all per ICEA S-68-516/NEMA WC8. Color code as per application.		
	a. 1 conductor, #6 AWG	Anixter	3BE-0601 or equal
	b. 1 conductor, #2 AWG	Anixter	3BE-0201 or equal
	c. 1 conductor, #4/0 AWG, black	Anixter	3BE-4041 or equal
	d. 1 conductor, #4/0 AWG, red	Anixter	3BE-4041 or equal
4	**TELEMETRY/DATA CABLE**		
	a. RG-213U coaxial cable, power limited cable Class 2, #13 AWG stranded copper conductor, 7 strands, bare copper shield, 97% shield overage, black, non-contaminating PVC Jacket	Belden	8267 or equal
	b. 4 conductor telephone cable, #22 AWG, 300 volt, solid copper conductors, 16 mils polyethylene insulation, gray PVC jacket. Conductors are colored green, red, yellow, black	Belden	9794 or equal
	c. RG-58A/U coaxial cable, #20 AWG, stranded copper conductor, 19 strands, bare copper shield, 95% shield coverage, black non-contaminating PVC jacket	Belden	8259 or equal
5	**PRE-TERMINATED FIBER OPTIC CABLE**	Anixter	019-0710-1-LLL
	Measure lengths for pre-terminated fiber cable (**FIBER PT**) as specified in Fenix Drawing 12534C3, CABLE AND CONDUIT SCHEDULE. See document pages **FIBER PRE-TERM ORDER- BK 1** and **FIBER PRE-TERM ORDER- BK 2** to see how many to order and what CABLE NUMBER for each cable required. Perform measurements as directed and record on the print. Order is directed to Anixter Morrisville, see contact information below. Order information for each cable to include LENGTH as determined on form from Column E, ORDER LENGTH, and CABLE NUMBER from CABLE NUMBER column on form.		
	"**CABLE WIRE NO. & SIZE**" column in Cable and Conduit Schedule, Cable Schedule, is: **FIBER-PT** (Fiber Pre Terminated).		
	Send Quote request and Purchase Order to: **Anixter,** Attention: **Chris Riggsbee**, Preferred contact method Email: chris.riggsbee@anixter.com phone: 919-616-6124, Address: **1055 Schieffelin Rd., Apex, NC 27502**		

CONTRACTOR-FURNISHED CABLE MATERIAL LIST

ITEM NO.	DESCRIPTION	SUPPLIER OR MFR.	CATALOG NO./TYPE
	Request Quote for each cable needed: PART NUMBER: **D18-0710-1-LLL,** where LLL is cable length in feet. In DESCRIPTION field, state: "**Cable Length is LLL FEET as indicated in part number suffix. Label cable both ends with Cable Number NNNN.**", where NNNN is Cable Number from Cable and Conduit Schedule.		
	Upon receiving quote, Send Purchase Order.		
6	**JUMPER CABLES – FACTORY MADE FIBER OPTIC AND COPPER CABLE**		
	a. Cable and Conduit Schedule Cable Type: **ZLC2M**. Corning, 2 fiber Zipcord Jumper, 2.0mm subunit, multimode, 62.5 micron, OM1, LC duplex to LC duplex connectors. Minimum Bend Radius during install is 2.0 inches, during operation 0.55 inches. Maximum tensile strength during install is 50 lbf. Length 7 feet. No substitutions.	Corning	050502K5120007F
	b. Cable and Conduit Schedule Cable Type: **ZLC3M**. Corning, 2 fiber Zipcord Jumper, 2.0mm subunit, multimode, 62.5 micron, OM1, LC duplex to LC duplex connectors. Minimum Bend Radius during install is 2.0 inches, during operation 0.55 inches. Maximum tensile strength during install is 50 lbf. Length 3 meters. No substitutions.	Corning	050502K5120003M
	c. Cable and Conduit Schedule Cable Type: **ZLC3S**. Corning, 2 fiber Zipcord Jumper, 2.0mm subunit, single mode, 9 micron, OS1, LC duplex to LC duplex connectors. Minimum Bend Radius during install is 2.0 inches, during operation 0.55 inches. Maximum tensile strength during install is 50 lbf. Length 3 meters. No substitutions	Corning	050502G5120003M
	d. Cable and Conduit Schedule Cable Type: **CA605C-xxx**. SEL CAT5E Shielded Patch Cord, STP, RJ-45 connectors both ends, jacket color Blue. Length is xxx feet as indicated in part number. PN: CA605CBXxxx. CAT5-04, CAT5-08	SEL	CA605C-004
	e. Cable and Conduit Schedule Cable Type: **C605A-xxx**. SEL EIA-232, DB9 connectors both ends. Length is xxx feet as indicated in part number. PN: C605Axxx. C605A-36, C605A-25	SEL	C605A-36 C605A-25
	f. Cable and Conduit Schedule Cable Type: **C961-xxx**. SEL Coaxial cable, LMR400 cable, TNC connectors both ends. Length is xxx feet as indicated in part number. PN: C961-xxx. C961-25, C961-50	SEL	C961-25 C961-50
	g. Cable and Conduit Schedule Cable Type: **C953-xxx**. SEL C953-6, C953-15, C953-25 SEL Coaxial cable, IRIG, RG58 cable, BNC connectors both ends. Length is xxx feet as indicated in part number. PN: C953-xxx. C953-6, C953-15, C953-25	SEL	C953-6 C953-15 C953-25

9

Forms

a. Contractor's Concrete Test Sample Report
b. Materials Receipt
c. Ground System Test

SUBSTATION FOUNDATION AND CONCRETE REPORT

OWNER: Fayetteville PWC

PROJECT NAME: PO HOFFER Substation

PROJECT NO.: 22-10714-8015

CONTRACTOR:

Foundation				
Concrete				
Depth of Excavation				
Excavated Material				
Dewatering Required				
Rebar Placed Properly				
Imbedments				
Anchor Bolt				
Size				
Spacing				
Alignment				
Nuts				
Construction Joint				
Chamfer				
Pad / Footing Size				
Pier Diameter / Size				
Pier Length				
Concrete Date				
Time Batched				
Time Arrived				
Time Placed				
Truck No.				
Quantity (C.Y.)				
Slump				
Air Percent				
Concrete Temperature				
Test Cyl. Results				

Remarks:

By:
Date:
Sheet:
Rev.:

Booth & Associates

MATERIALS RECEIPT

OWNER: Fayetteville PWC
CONTRACTOR:
PROJECT NAME: PO HOFFER Substation
PROJECT NO.: 22-10714-8015
DATE:

ITEM*	QUANTITY	DESCRIPTION OF ITEM	MANUFACTURER AND CATALOG NUMBER	UNIT COST	EXTENDED COST
TOTAL					

RECEIVED BY	**FOR**
	Contractor
	Owner

*Item corresponds with item in list of materials in construction drawings.

GROUND SYSTEM TEST
SIMPLIFIED FALL-OF-POTENTIAL
(THREE-POINT METHOD)

CLIENT: Fayetteville PWC
LOCATION:
PROJECT NAME: PO HOFFER Substation
PROJECT NO.: 22-10714-8015
RECORDED BY:
DATE:

Instrument Mfr. _____
Model _____
Serial # _____

Ground System Type: ☐Single Rod ☐Ground Well ☐Multiple Rods (Grid)

Rod Depth (ft.) _____
Well Depth (ft.) _____
Longest Diagonal Dimension (ft.) _____

Current Probe Distance _____

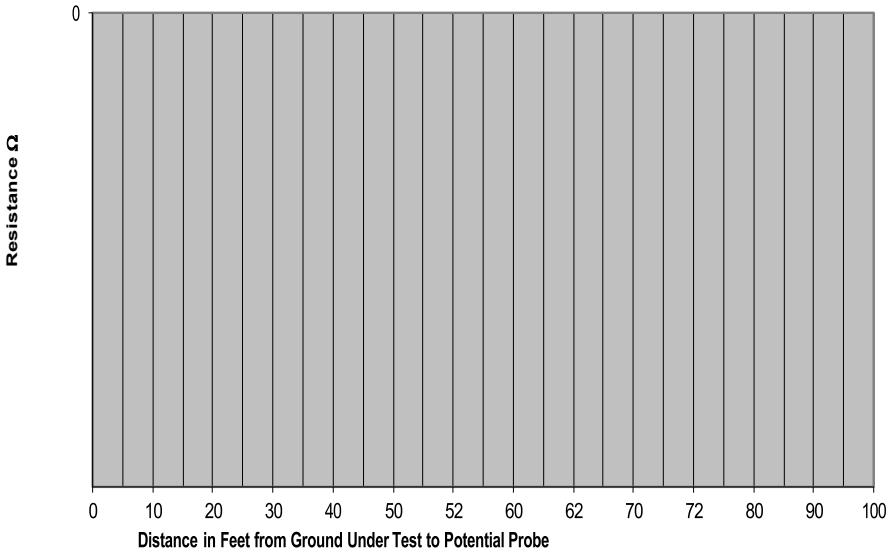
TEST CONDITIONS

Temp: _____ Soil: ☐Wet ☐Moist ☐Dry

Soil Type

☐Loam ☐Sand & Gravel ☐Shale ☐Clay ☐Limestone
☐ Sandstone ☐ Granite ☐ Slate ☐Other

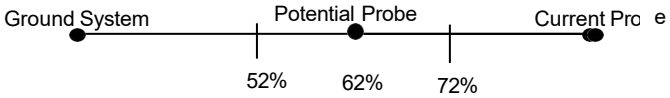
%	Potential Probe Distance from Ground System FEET	Measured Resistance OHMS
0		
10		
20		
30		
40		
50		
52		
60		
62		
70		
72		
80		
90		
100		



Resistance Scale Multiplier

☐X1
☐X10

Distance Scale Multiplier: ☐ x 1 ☐ x 10

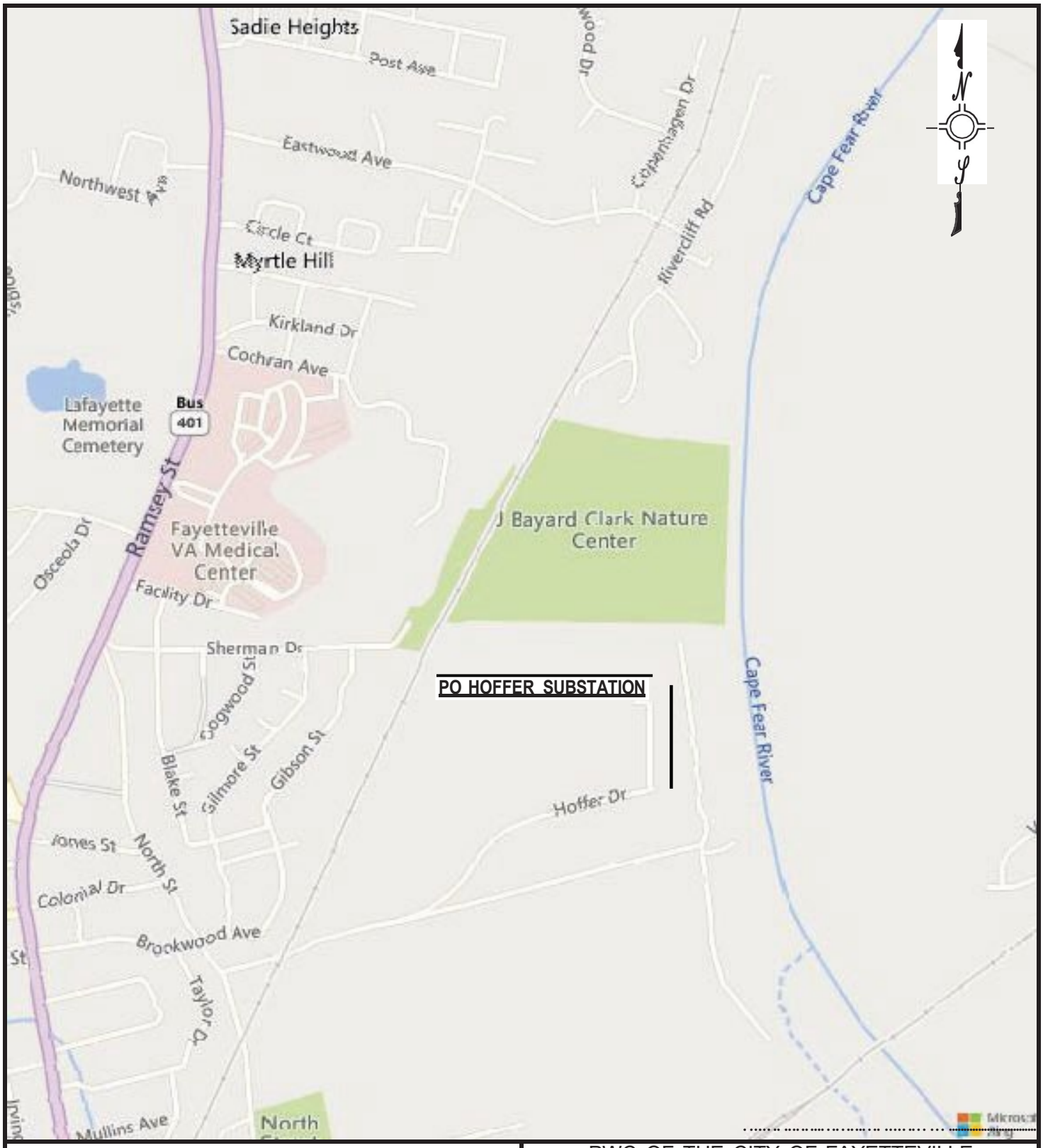


Of distance from ground system to current probe

Remarks:

10

Vicinity Map



SITE LOCATION

ADDRESS:
570 HOFFER DRIVE,
FAYETTEVILLE, NC 28301

PWC OF THE CITY OF FAYETTEVILLE
FAYETTEVILLE, NORTH CAROLINA

PO HOFFER 69 TO 15 X 25 kV SUBSTATION VICINITY MAP

Booth & Associates

DWN. AAI	DATE: 06/06/22	DWG. NO.
CKD. EAR	APPD. EAR	
SCALE: 1" = 1,000'	FILE: 12513VM	
JOB NO. 2210714	DATE / REVISION	VM-1
© 06/2022		